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SPECIAL EDITION NO. 5

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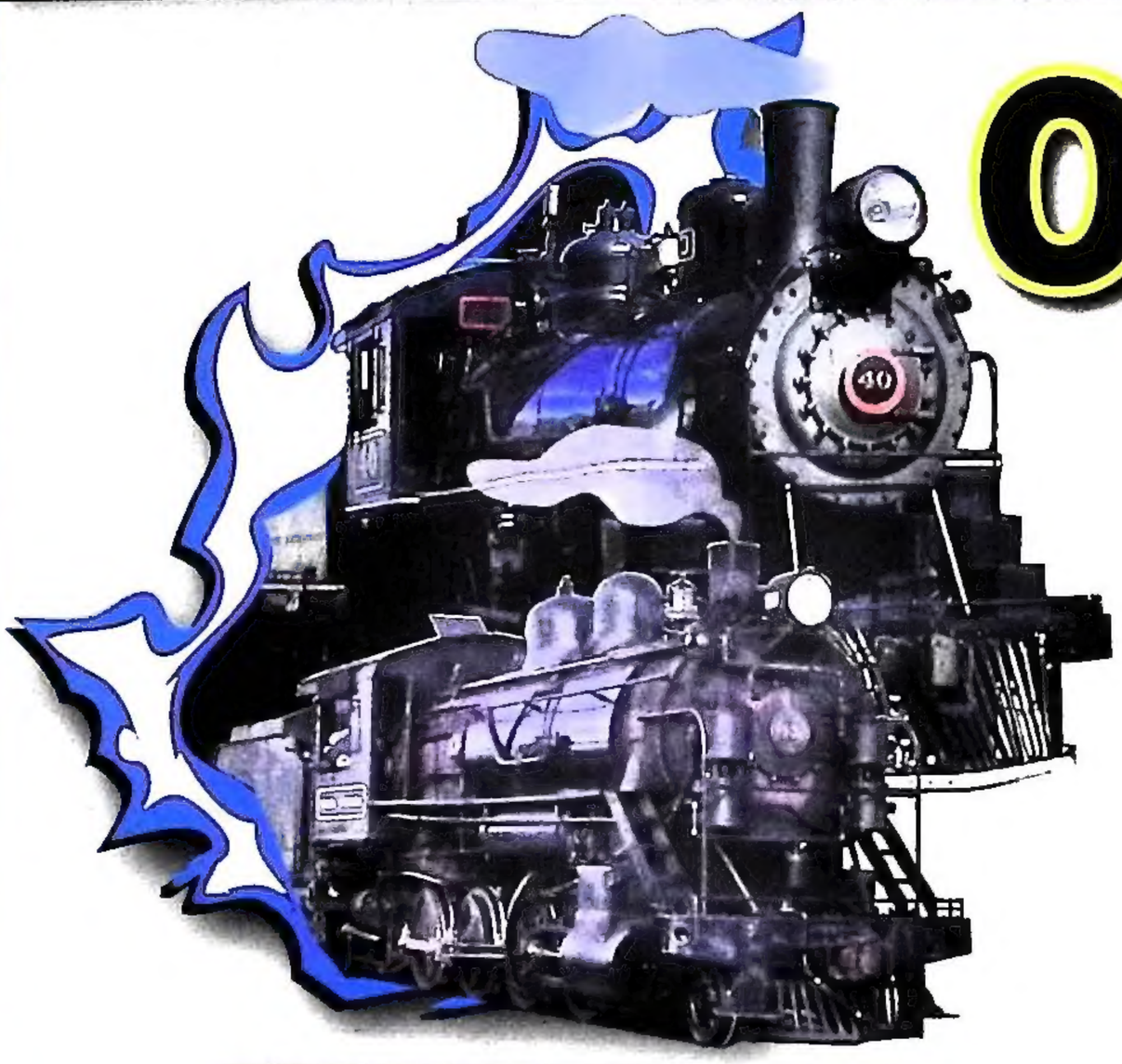

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STEAM Glory 2

Classic Trains SPECIAL EDITION NO. 5

Lost World of the Great Locomotives

CLASSIC TRAINS SPECIAL EDITION NO. 5 • 2007

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Our first STEAM GLORY was a hit, so we did another!

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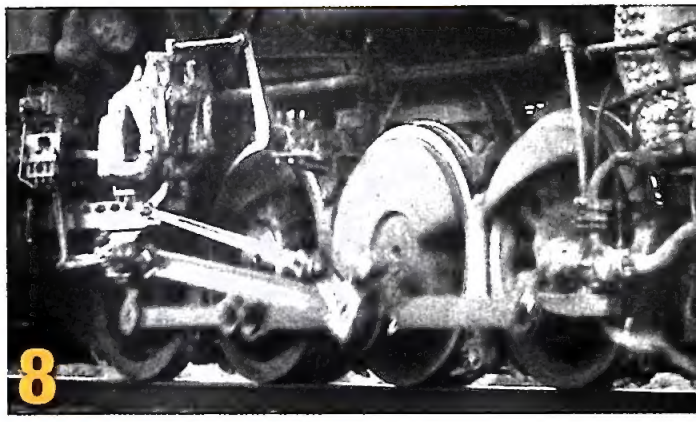

On the cover: Pennsylvania Railroad K4s Pacific No. 5406 roars south along the shore of New Jersey's Raritan Bay on March 17, 1956, with a New York & Long Branch commuter train. *William S. Young photo*

Back by popular demand: More glorious steam

Three years ago, we published STEAM GLORY as the second in our series of CLASSIC TRAINS annual Special Editions. The success of that issue led us here, to STEAM GLORY 2. The line-up this time around features a mix of enginemen's stories, railfan recollections, studies of notable locomotives, and photographs of steam at work.

Beginning on page 28, a man who left his Ohio farm to go firing on the Erie tells about the magnetic pull of steam in the early 1940's. "A Day with Engineer Herbel" [page 60] uses photographs to depict the working life of a Nickel Plate Road hogger at the very end of steam. A Santa Fe man tells about getting freights up and down Cajon Pass with 2-10-2's [104].

Steam pulled non-railroaders to trackside as well, of course. A man who journeyed to New Jersey for the last Pennsy K4's recalls a surprise ride aboard one [22]. Another found time during a family vacation in Ontario to photograph CN and CP engines in full stride [38]. Our own Senior Editor Dave Ingles caught UP Challengers at work in their final days [70].

RAILROAD PHOTOGRAPHIC CLUB: H. W. PONTIN

The power of machines like Erie 2-8-4 No. 3393, eastbound at Marion, Ohio, pulled young men off the farm and railroads into the black.

"The Berkshire Story" [8] traces the evolution of the 2-8-4 from drag engine to fast freighter. We explain the Reading's famous T-1 4-8-4's and last-of-their-kind G-3 4-6-2's, along with the shops that built them [46]. We compare early streamlining designs for NYC Hudsons with the finished products [78]. "SP's Painted Ladies" [86] looks at some dolled-up 0-6-0's. And we profile Kansas City Southern's giant 2-10-4's, the road's last and best in steam [94].

Finally, as in STEAM GLORY, our photo gallery is all-color. Here, it's presented in two-page segments throughout the issue, starting on page 20—and there's another twist as well.

We hope you enjoy our latest nod to the glory of steam.

Robert S. McGonigal

STEAM Glory 2
CLASSIC TRAINS SPECIAL EDITION NO. 5 • 2007

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2-8-4 "BERKSHIRE" ~ 3RD SERIES

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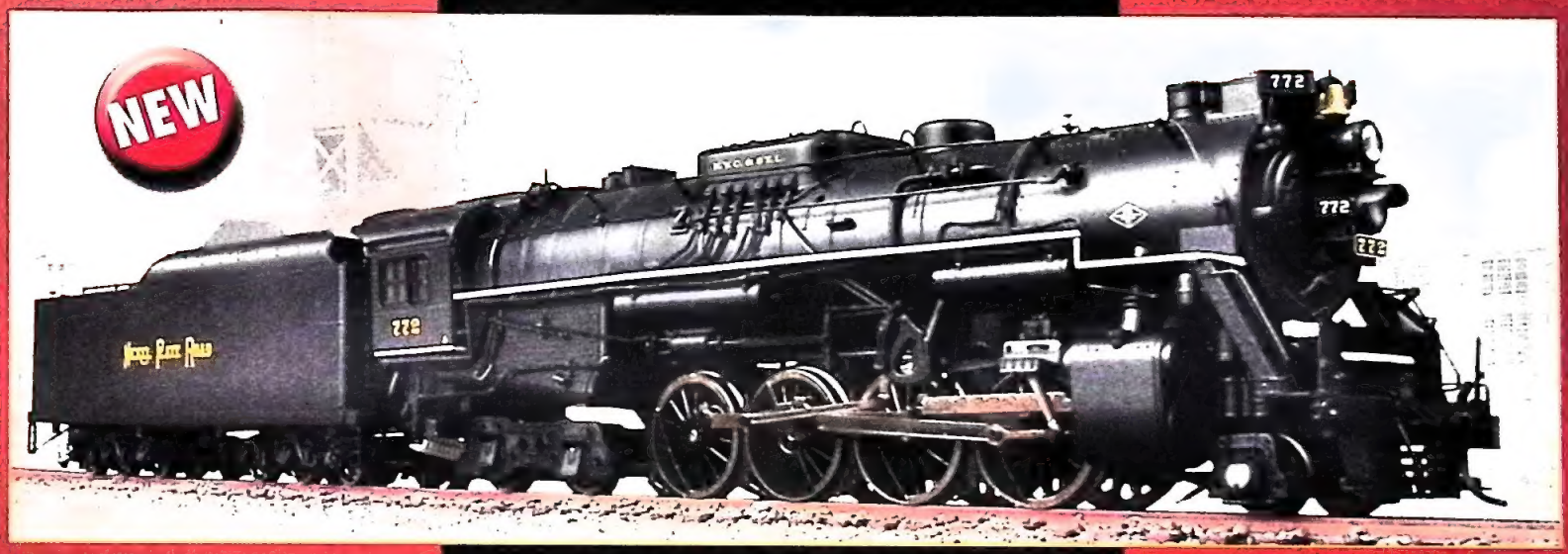

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Among these were C&O, Nickel Plate and Pere Marquette, controlled by the Van Sweringen brothers. In 1929, management formed the "Advisory Mechanical Committee" to oversee future locomotive development, including new 2-8-4s for NKP and PM. C&O's 2-8-4s were copies of these engines, built during World War II when production was limited to existing designs. Representing the best of modern steam, these late 2-8-4s were soon displaced by diesels in the 1950s, but some were held in reserve into the early 1960s. Several Van Sweringen Berkshires were preserved, with three restored to operation.

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920-31682 Standard DC

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Contributors

NEIL CARLSON ["The Berkshire Story," pages 8-19], who grew up in Buffalo, N.Y., in the 1950's, has had a lifetime fascination with steam power, reinforced by visits to the local Nickel Plate roundhouse as a teenager ["My First Berkshire," pages 34-39, Summer 2006 CLASSIC TRAINS]. When the Nickel Plate dieselized in 1958, he refocused on Ontario, where Canadian National and Canadian Pacific both ran steam for another year and a half. He attended college in Ohio, and after earning degrees in Electrical Engineering, he moved to California's Silicon Valley, where he worked for several high-tech firms. Now retired, he lives in Santa Cruz, Calif. Neil authored the feature story "Fast-Freight Articulateds" in our Special Edition No. 2, STEAM GLORY 2004.

TOM DILL ["Southern Pacific's Painted Ladies," pages 86-91] has been fascinated by trains for as long as he can remember. In 1967, he hired out in engine service on SP's Coast Division. He moved to the Oregon Division in 1970, was promoted to engineer in 1974, and has worked for SP and UP on virtually every mile of SP, or former SP, track in Oregon. He has authored or coauthored several books, mostly about SP's Oregon lines. His first CLASSIC TRAINS byline was his Winter 2006 entry, "Bob Searle: Born to Railroading," in the "Great Photographers" series.

JACK O. ELWOOD ["Santa Fe Types on the Santa Fe," pages 104-110], a retired Santa Fe engineman who lives in Fresno, Calif., has had four stories in CLASSIC TRAINS since Spring 2003. This is his second byline in one of our Special Editions, following "Pinnacle of Service" in No. 2, STEAM GLORY 2004.

PETER A. HANSEN ["Green Giants," pages 94-100], a freelance writer who lives with his wife, Bonnie, near Kansas City, has had two articles in CLASSIC TRAINS, but this is his third Special Edition feature byline, following stories on Northern Pacific's *North Coast Limited* in DREAM TRAINS 2003 and Rock Island's early *Rockets* in STREAMLINER PIONEERS 2005.

J. DAVID INGLES ["Challengers East," pages 70-77], Senior Editor of CLASSIC TRAINS and TRAINS, vacationed in Colorado with his parents and sister several times in the 1950's ["Overnight to Denver," pages 18-25, Spring 2004 CLASSIC TRAINS], but his largest file of steam color slides is of the Grand Trunk Western in Michigan, where he lived as a teenager and during college years. He is pictured, in a photo by his late father, at the Cheyenne roundhouse full of silent Big Boys on the overcast weekend following the sunny one he spent chasing the Challengers and riding Jim Ehernberger's charter trip on the Colorado & Southern behind 2-10-2 No. 900 from Cheyenne to Guernsey, Wyo., and return.

MERT LEET ["Crown Steam," pages 38-44], a native of Mayville, N.Y., who earned a degree in Bacteriology from Cornell University in Ithaca, N.Y., took up color train photography in 1951 after a two-year Army stint when he rejoined Crown Can in a meat inspection role at its Chicago lab. Marriage (to Mary, in 1952) and two children slowed his railroad photography until the 1970's. Mert joined the Carnation Co. in Oconomowoc, Wis., in 1962, and the Leets have lived there ever since. Mert has been retired since 1992. His early 1950's color slides have provided CLASSIC TRAINS with several entries in the "One Day at . . ." series, plus occasional other photos.

CHUCK LEFEVER ["Farm Boy to Fireman," pages 28-34] served in the Navy during World War II, then returned to Erie engine service. Retired from a career with R.H. Macy Department Stores, he lives with his wife, Ann, in New Jersey. His article, "Making Time on the Midlander," appeared in Winter 2004 CLASSIC TRAINS.

DON STOTT ["An Unforgettable Ride," pages 22-27] is a resident of Montrose, Colo. This is his first byline in a CLASSIC TRAINS publication.

RICHARD L. STOVING ["Streamlining the Central's Thoroughbreds," pages 78-83] has had a lifelong love for railroads. He grew up on the New York Central's River Division, and has served as a trustee/director of the New York Central System Historical Society since 1976. Following a 31-year career as a teacher and education administrator in New York City, Rich retired to rural Pennsylvania, where he served as an engineer and conductor on an excursion line on what was once part of NYC's Pennsylvania Division. Rich, who built an HO-scale version of NYC's Hudson Division, has authored several articles for MODEL RAILROADER and *Railroad Model Craftsman* magazines. In 2003 he published his first book, "Wellsboro's Own Railroad," a history of part of the Fall Brook Railway, and he has since authored three books on NYC steam power. This is his first byline in a CLASSIC TRAINS publication.

DON WOOD ["Sad Day at South Amboy," page 24] was one of the greatest and most prolific photographers during the steam-to-diesel transition era. He extensively documented the K4 operations on the New York & Long Branch. Don died in June 2006.

DALE W. WOODLAND ["Reading Shops," pages 46-56] is a retired schoolteacher living in Souderton, Pa., a former Reading Company point. He has authored four books on the Reading, as well as the "Fallen Flags Remembered" essay on the road for Summer 2000 CLASSIC TRAINS. Dale edits the "Seashore Lines" and "Keystoner" columns in *Railpace Newsmagazine*.

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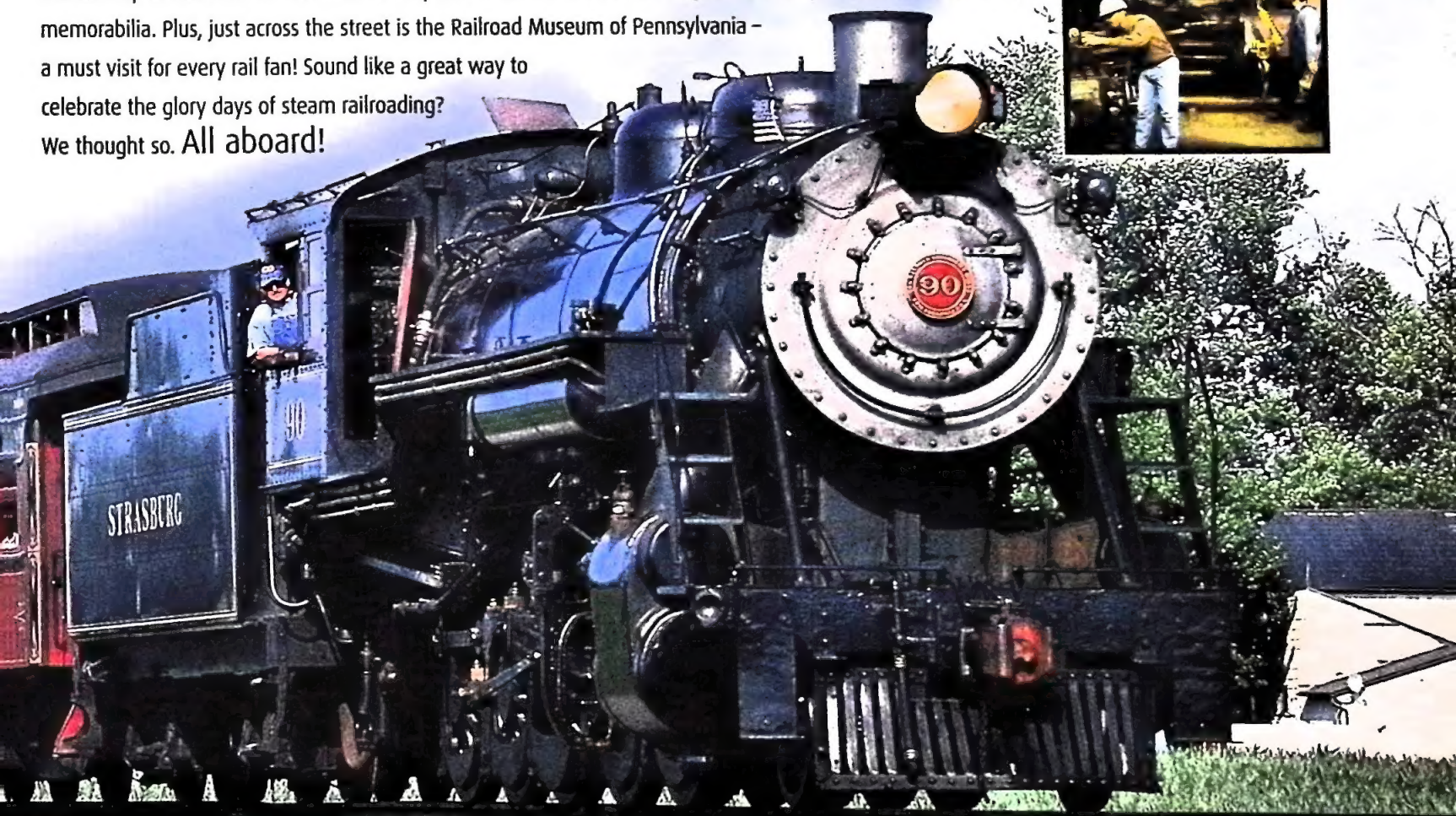

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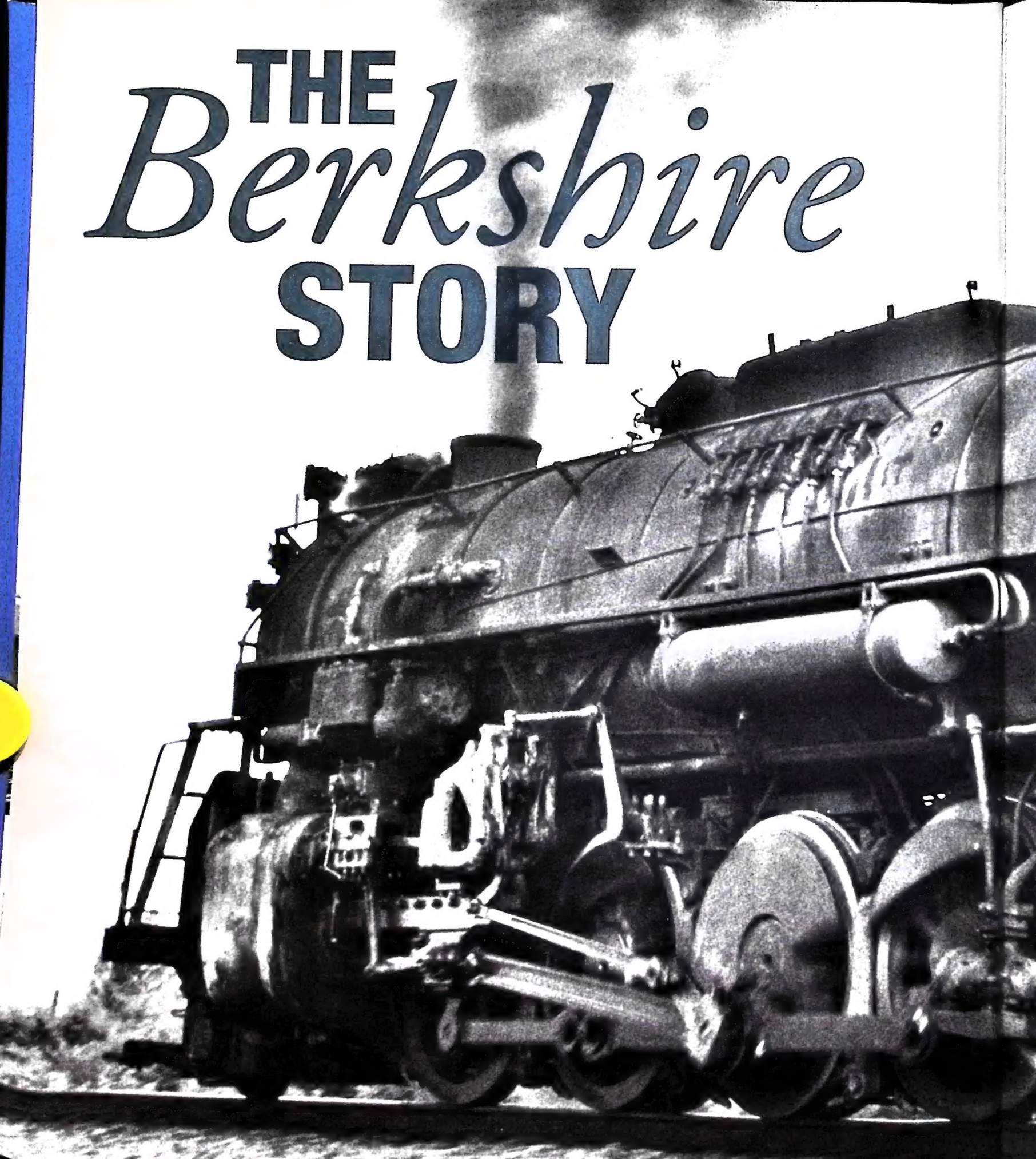
THE *Berkshire* STORY



As the first "Super-Power" design, the 2-8-4 began as a potent tonnage-hauler that evolved into the very symbol of fast-freight steam power

BY **NEIL CARLSON**

NICKEL PLATE F
of NKP's 80 fast
redball freight ne

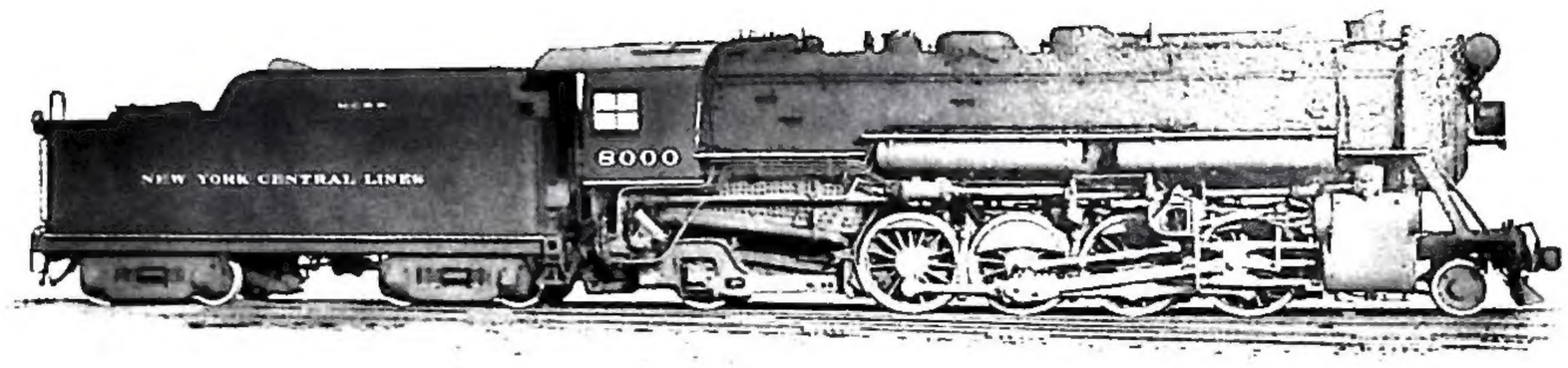
Thanks to the Nickel Plate Road, the common image of a 2-8-4 Berkshire type is at the head of a redball freight eating up the miles at 60 mph in order to make a tight connection in Buffalo. Berkshires enabled the Nickel Plate to rely on steam longer than most railroads. Until July 1958, NKP's hottest trains where entrusted to its magnificent 2-8-4's, and the road became a mecca for fans in search of steam. Although this is an accurate image of the 2-8-4, there is a lot more to the story. The first Berkshires were not known for their speed. Indeed, the name Berkshire comes from the Berkshire Hills of western Massachusetts where the first of the type cut their teeth lugging freight up heavy grades.

The Berkshire story revolves around three people: William E. Woodard, John Bernet, and William Black. Woodard was vice president of engineering at Lima Locomotive Works; he led the development of the 2-8-4. Bernet and Black, while at the Erie and then the Nickel Plate, took Lima's 2-8-4 and turned it into what is best remembered as being—a high-speed freight engine.

LIMA SEES AN OPPORTUNITY

During the 1920's, the United States experienced a period of rapid economic expansion and, in sustaining this growth, the nation's railroads were severely strained. Capital investment had come to a halt during World War I, and now railroad infrastructure needed a major investment to increase capacity. Double-tracking, more sidings, better signaling, heavier rail, stronger bridges, and more locomotives were all on the needs list.

Lima Locomotive Works looked this situation and saw an opportunity—a big one. Will Woodard knew that the easiest and least expensive way to increase capacity was simply to run longer and faster trains. Further, the railroads were ripe for new power. The existing locomotive fleet, with thousands of elderly Consolidations and Ten-Wheelers (many non-superheated), was hopelessly obsolete. There were far too few modern 2-8-2's and 4-8-2's. Lima's strategy was simple: design and build faster, more-powerful locomotives.



LIMA

MICHIGAN CENTRAL Lima introduced many of the "Super-Power" ideas that would make Berkshires great in MC 8000, a 2-8-2 built in 1922. It was a star, prompting MC parent NYC to order 300 copies.

Lima's initial entry was a state-of-the-art 2-8-2 that did not require the development of any new technology. Woodard simply used the very best of what was currently available. The locomotive had as big a firebox and grate as could be supported by a two-wheel trailing truck. It used the new Type E superheater, which could be configured to provide both more superheating surface and greater evaporative surface than a locomotive equipped with the older Type A superheater. It also came with a feedwater heater. This appliance tapped into the exhaust steam and used a portion of it to preheat boiler feedwater. A feedwater heater could add as much as 10 percent to locomotive performance simply by utilizing energy that would normally be lost going up the stack. In common with most freight power of the time, its driving wheels were 63 inches in diameter. It also was equipped with a trailing-truck booster that added an additional 13,200 pounds of tractive effort at low speeds and while starting.

The locomotive, given the number 8000, ran a series of trials on the Michigan Central, a subsidiary of the New York Central. It was compared to a heavy Mikado of about the same size (NYC's class H-7) that was only two years old. No. 8000 outperformed the H-7 by 26 percent. The 8000 had been designed with a new philosophy that emphasized drawbar horsepower, and not just drawbar pull. Given similarly sized trains, the 8000 could accelerate and pull its train faster than the H-7. Additionally, when it wasn't working hard, it was more efficient than the H-7. It burned less coal and used less water. New York Central was impressed, and purchased an additional 300 nearly identical 2-8-2's, classified H-10, for use all over the system.

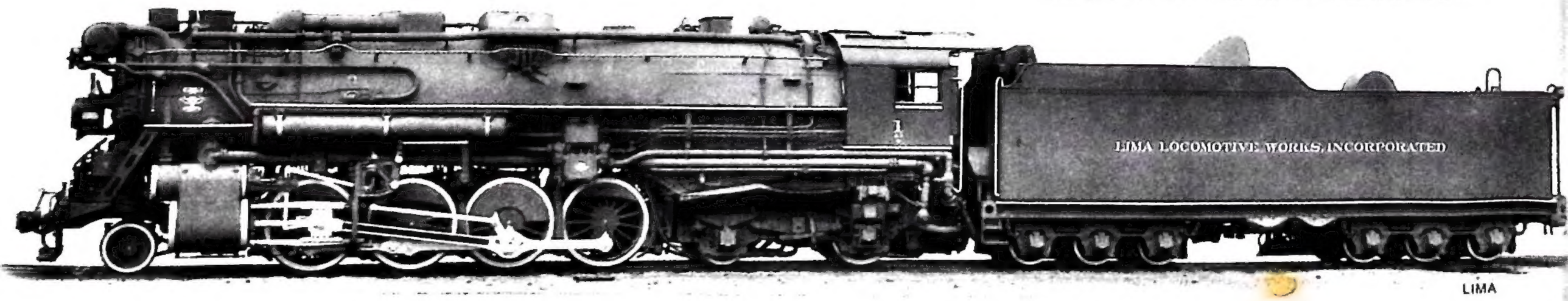
LIMA'S A-1

After the 8000, Lima pushed the envelope even further with the development of a new high-capacity boiler. Good design practice called for equipping a new locomotive with the most powerful boiler that could be practically mounted to its frame. However, to achieve the results desired by Woodard, boiler capacity had to be pushed beyond the then-current state-of-the-art. The Lima men knew that fuel burns more efficiently if it can be burned more slowly. Let's say a locomotive is burning 32 tons of coal per hour. If this is burned on a 70-square-foot grate, it takes a firing rate of 100 lbs. of coal per square foot per hour. If the same amount of coal is burned on a 100-square-foot grate, the firing rate will be only 70 lbs. per square foot per hour—a substantial difference. The slower rate allows more of the heat from the fuel to be absorbed by the boiler.

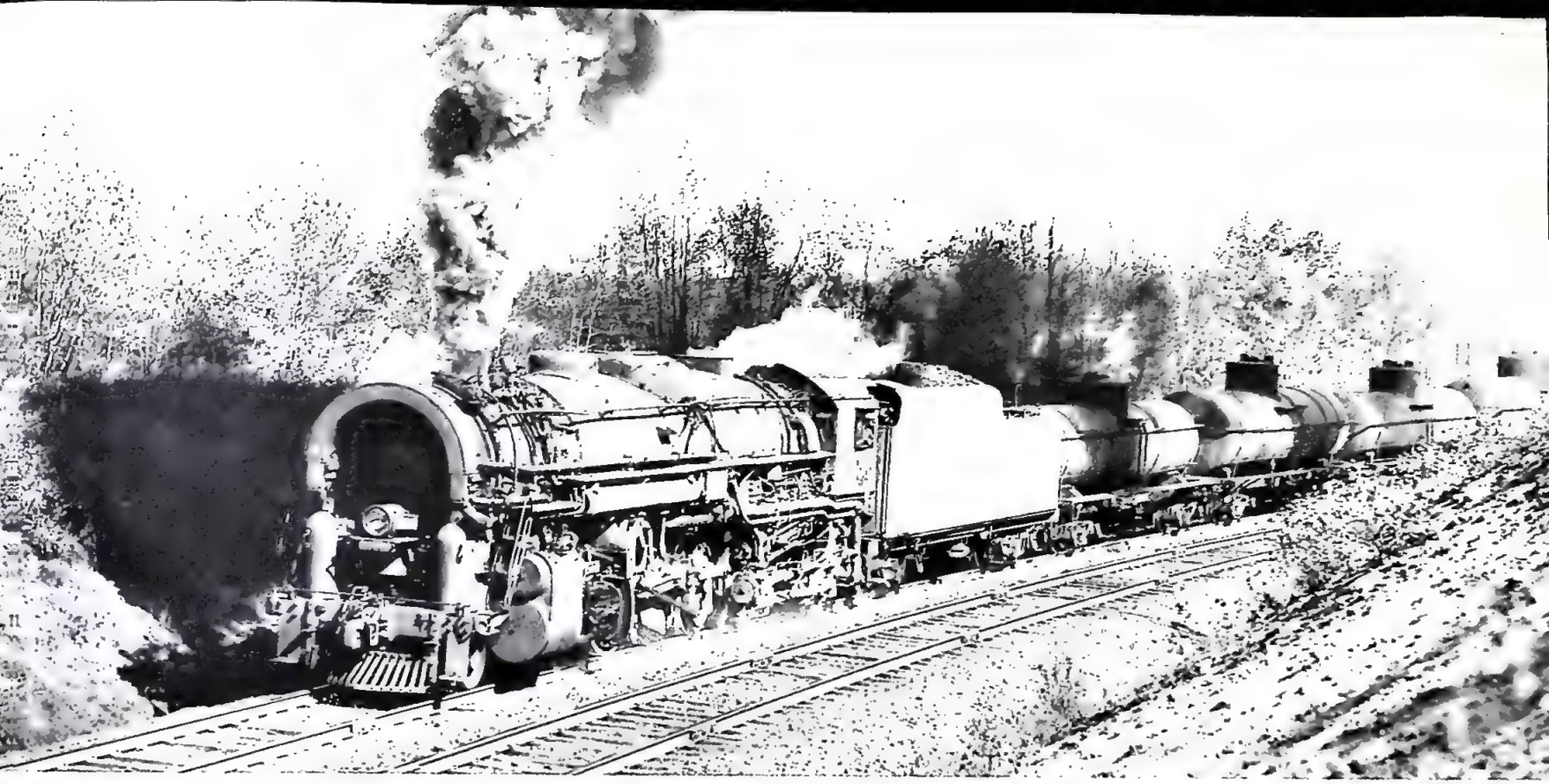
A bigger grate was the answer. The difficulty was that 70 square feet of grate area was just about at the practical limit of what could be supported by a single-axle trailing truck. So, to incorporate a 100-square-foot grate, Lima introduced the two-axle trailing truck. The 2-8-2 thus became a 2-8-4—the first "Super-Power" (as Lima called it) steam locomotive design.

This locomotive had another innovative feature: limited cut-off. Normally, when a

LIMA'S A-1 Building on MC 8000's success, Lima developed a bigger boiler and firebox. The added weight required a four-wheel trailing truck, and so the 2-8-4 was born. Lima's A-1 tested on several roads.



LIMA



H. F. HARVEY

BOSTON & MAINE Hood-like Coffin feedwater heaters gave a menacing look to T-1a 4009 and her sisters, which were otherwise similar to the A-1. Ousted by FT's, 7 went to the Santa Fe, 10 to the SP, in 1945.

locomotive is starting, steam admission to the cylinders continues for about 85 percent of the full stroke, at which point the valve closes and cuts it off. With limited cut-off, the steam was cut off at 60 percent of the stroke and then allowed to expand against the piston for the remainder of the distance. The benefit was that this made use of the heat energy contained in the steam as it expanded—it was more efficient. Of course, even a full-stroke engine used expanding steam once it got moving. After speed increased, the engineer would adjust the cut-off to 70 percent, then 60 percent, and, when speed picked up some more, to 50 percent and so on. The advantage with limited cut-off was that the engine always worked with expanding steam, no matter its speed. It was a popular concept in the 1920's and was promoted heavily by Lima.

The new 2-8-4 otherwise employed existing technology. This included the Type E superheater, a trailing-truck booster, and an Elesco feedwater heater. However, it still had relatively low (by later standards) 63-inch drivers. Lima gave it the designation A-1 and sent it on a series of trials in the East and Midwest. The first were on another New York Central subsidiary, the Boston & Albany, in early 1925.

RALPH E. HALLOCK

BOSTON & ALBANY NYC's New England subsidiary was the first customer for production versions of Lima's A-1. B&A 1426 and 1435 are eastbound with a freight near Chatham, N.Y., on May 31, 1946, hammering into the hills that gave the 2-8-4 type its name.

The B&A tests were run on a 60-mile segment through the Berkshire Hills of western Massachusetts. The line had many curves, an average grade of 1 percent, and some stretches of 1.5 percent. The A-1 was compared against a two-year-old H-10 2-8-2 of the same design as Lima's 8000. Nine test runs were made, and the results were nothing short of spectacular. The A-1 showed an increase in drawbar horsepower over the H-10 of 26 to 30 percent at all speeds. Once again, the NYC knew a good thing when it saw it: the B&A took delivery of 45 2-8-4's based on the A-1 in 1927 and another 10 in 1930.

Upon completion of its trials on the B&A, the A-1 moved to neighboring Boston & Maine. A competitor to the B&A, the B&M had a parallel line across western Massachusetts that was then worked by 2-10-2's. During its tests on the B&M, the A-1 cut two hours off the normal running time over the 210 miles between Mechanicsville, N.Y., and Boston. While the B&M was impressed with these results, it was not until almost two years later that the road placed an order for 20 engines for delivery in 1928; another five arrived in 1929. Unlike the A-1 and the B&A engines, the B&M 2-8-4's came with Coffin feedwater heaters. They were hung on the front of the smokebox, giving the locomotives a distinctive, hooded look.

After returning from the B&M, the A-1 tested on the Illinois Central. At the completion of a series of trials, IC ordered 50 similar locomotives that were delivered in late 1926—ahead of both the B&A and the B&M engines. Later, the IC also bought the A-1 itself. All worked in southern Illinois. The IC Berkshires had an important feature not included on the A-1 or the B&A engines: two Nicholson thermic syphons in the firebox. Syphons draw water from the base of the rear tube sheet, where it is coolest, and route it up through the firebox to the top of the crown sheet. Moving this cooler water through the very hot firebox enhances the transfer of heat to the water. The Boston & Maine engines were also fitted with syphons.

Other builders joined in. American Locomotive Co. built 12 2-8-4's for the Chicago & North Western in 1927. These included all of the key features of the A-1, including limited cut-off. The major departure was the incorporation of a Commonwealth cast-steel trailing truck instead of Lima's articulated model. The C&NW locomotives were then copied by Alco subsidiary Montreal Locomotive Works, which in 1928 built two engines for the Toronto Hamilton & Buffalo—Canada's only Berkshires. Also in 1928, Alco delivered five 2-8-4's to Missouri Pacific subsidiary International-Great Northern, followed by Lima the next year with 25 engines to the MoPac itself.

In 1927 Baldwin got into the act and delivered 15 2-8-4's to the Santa Fe. These were not copies of the A-1. The grate area was close to that of the A-1, but the Baldwin engines had the older Type A superheater, giving them less total heating surface. In another departure from the A-1 design, they were full-stroke engines. The Santa Fe assigned them to fast freights operating east of Kansas City, but they really were not fast-freight engines. In their later years they were converted to burn oil and worked in Texas and New Mexico. They were joined in 1945 on the Santa Fe by seven 2-8-4's from the Boston & Maine, which was dieselizing.

Berkshire specs: A-1, AMC, and the rest

	8000	LIMA A-1 DESIGNS					
Railroad	MC	Lima	B&A	IC	C&NW	B&M	MP
Class	2-8-2	A-1	A-1a	L-63	J-4	T-1a	BK-63
Road Numbers	8000	1	1400-1424	7000-7049	2801-2812	4000-4019	1121-1125
Builder	Lima	Lima	Lima	Lima	Alco	Lima	Alco
Year	1922	1925	1926	1926	1927	1928	1928
Cylinders:							
bore x stroke (in.)	28x30	28x30	28x30	28x30	28x30	28x30	28x30
maximum cut-off	full stroke	60%	60%	60%	60%	60%	60%
Driver dia. (in.)	63	63	63	63	63	63	63
Boiler:							
pressure (PSI)	200	240	240	240	240	240	240
grate area (sq. ft.)	66.4	100	100	100	100.3	100	100.3
fuel	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal
cmbstn. chmbr. (in.)	none	none	none	none	none	none	none
tube length (ft.- in.)	20-0	20-0	20-0	20-0	20-0	20-0	20-0
syphons	none	none	none	2	2	2	2
heating surfaces:							
evaporative (sq. ft.)	4,578	5,110	5,110	5,164	4,872	5,131	5,118
superheater (sq. ft.)	1,780E	2,111E	2,111E	2,111E	2,243E	2,111E	2,121E
Weights in working order:							
on drivers (lbs.)	245,500	248,200	249,500	248,000	253,500	250,200	267,500
engine (lbs.)	334,000	385,000	389,000	388,800	397,000	393,000	404,000
tender (lbs.)	199,700	275,000	201,900	286,000	287,000	216,400	285,600
Rated tractive force	74,500B	82,600B	81,400B	81,400B	79,500B	78,550B	81,400B
Factor of adhesion	3.86	3.58	3.6	3.57	3.77	3.61	3.79
Tender cap.: fuel	16 tons	18 tons	16 tons	20 tons	20 tons	18 tons	18 tons
water (U.S. gal.)	10,000	15,000	10,000	15,000	15,000	12,000	15,000

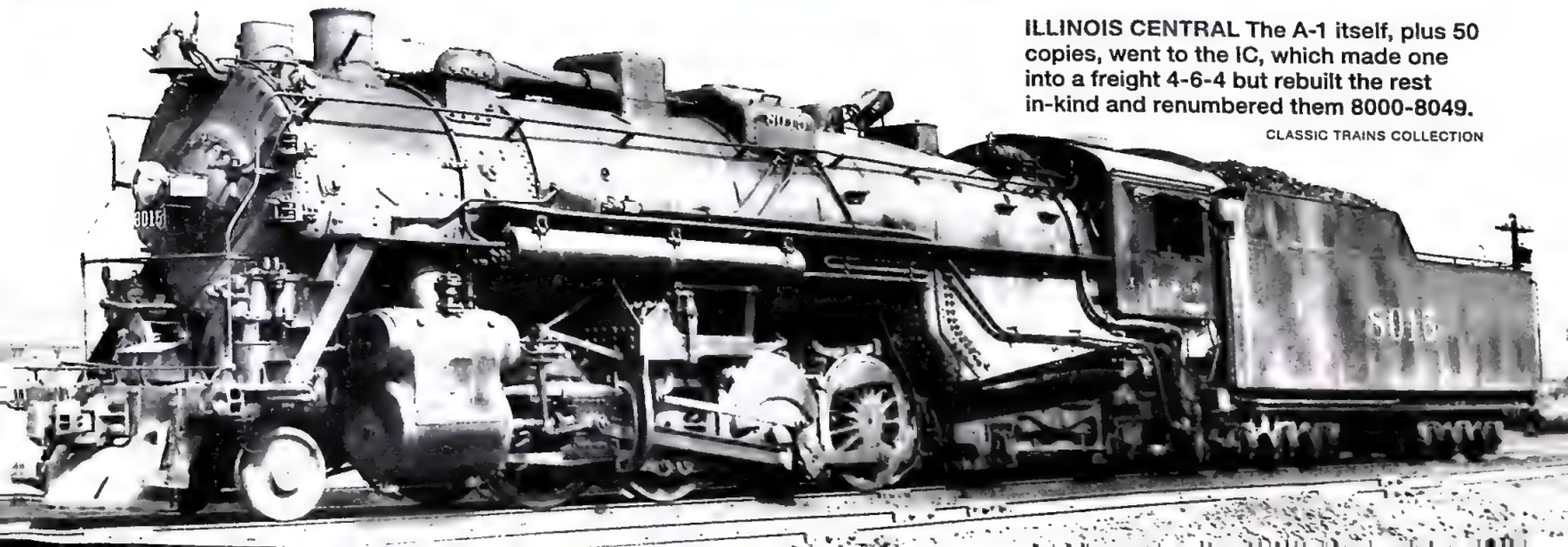
E or A = type E or A superheater; B = tractive force including booster

POWER AND SPEED

In 1926 control of the Erie Railroad had passed into the hands of Oris P. and Mantis J. Van Sweringen. The brothers were real estate developers in Cleveland and had gotten into the railroad business as a means to obtain a rapid-transit right-of-way from downtown Cleveland to suburban Shaker Heights, where they had a large residential development. As a part of this venture, they purchased the Nickel Plate Road, followed by a controlling interest in the Pere Marquette, the Chesapeake & Ohio, and the Erie.

The Erie was not a healthy company, and the Vans brought in John Bernet, who had previously turned around the Nickel

	ERIE	AMC DESIGNS							OTHER DESIGNS			
TH&B	Erie	NKP	W&LE	PM	RF&P	L&N	C&O	VGN	AT&SF	DT&I	NS	P&LE
A	S-2	S	K-1	N	--	M-1	K-4	BA	4101	--	--	A-2a
201-202	3325-3349	700-714	6401-6410	1201-1210	571-580	1950-1963	2700-2739	505-509	4101-4114	700-703	600-604	9400-9406
Montreal	Lima	Alco	Alco	Lima	Lima	Baldwin	Alco	Lima	Baldwin	Lima	Baldwin	Alco
1928	1927	1934	1937	1937	1942	1942	1944	1946	1927	1935	1940	1948
28x30	28½x32	25x34	25x34	26x34	25x34	25x32	26x34	26x34	27x32	25x30	23½x30	26x32
60%	60%	full stroke	full stroke	full stroke	full stroke	full stroke	full stroke	full stroke	full stroke	full stroke	60%	80%
63	70	69	69	69	69	69	69	69	63	63	63	63
240	250	245	245	245	245	265	245	245	220	260	250	230
100.3	100	90.3	90.3	90.3	90.3	90.2	90.3	90.3	99	88.3	80.3	90.3
soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal	soft coal
none	none	42"	42"	42"	42"	42"	42"	42"	none	27"	?	42"
20-0	21-0	19-0	19-0	19-0	19-0	19-0	19-0	19-0	20-9	18-0	18-0	18-0
none	none	2	2	2	2	2	2	2	none	none	2	none
5,080	5,697	4,818	4,718	4,785	4,772	4,654	4,773	4,773	4,577	4,493	3,418	4,276
2,243E	2,545E	1,992E	1,924E	1,932E	1,932E	1,908E	1,932E	1,932E	1,246A	1,795E	1,350E	1,881E
249,500	274,000	254,000	259,500	278,000	270,900	268,200	292,000	295,600	268,200	248,600	202,900	270,500
383,000	457,500	416,000	407,500	445,500	433,200	447,200	460,000	460,400	396,500	411,500	335,400	426,000
228,000	309,000	358,800	364,500	358,000	358,000	384,200	390,000	401,000	285,100	361,370	245,240	342,000
69,000	72,00B	64,100	64,100	69,350	64,100	79,390B	83,750B	69,350	82,800B	65,780	60,400B	67,100
3.62	3.81	3.96	4.04	4.01	4.23	4.11	4.21	4.26	3.73	3.92	4.11	4.03
16 tons	24 tons	22 tons	22 tons	22 tons	22 tons	24 tons	30 tons	21 tons	20 tons	22 tons	16 tons	22 tons
12,000	16,500	22,000	21,700	22,000	22,000	22,000	21,000	25,000	15,000	22,000	14,000	20,000



ILLINOIS CENTRAL The A-1 itself, plus 50 copies, went to the IC, which made one into a freight 4-6-4 but rebuilt the rest in-kind and renumbered them 8000-8049.

CLASSIC TRAINS COLLECTION

TORONTO, HAMILTON & BUFFALO Canada's only Berkshires, TH&B 201-202, were copies of C&NW's J-4, with a few NYC-style details. They worked the *Starlight*, a nocturnal Hamilton–Niagara Falls freight.

RAILFARE

Plate, to take charge. What he found was a railroad whose main line managed to bypass almost all the major cities along its route. Consequently, the Erie originated a disproportionately low amount of traffic for its route-miles. Further, the railroad had a "tonnage mentality" that resulted in the operation of heavy drags handled by 2-10-2's and 2-8-2's.

Bernet quickly grasped the situation. He put together a plan that called for turning the road into a high-speed bridge route. The Erie's city-skirting main line could be turned into an asset when used to expedite freight from Western connections to Eastern markets. However, before this plan could be implemented, the railroad's operating philosophy needed to be turned on its head, and a new fleet of high-speed freight engines would be required.

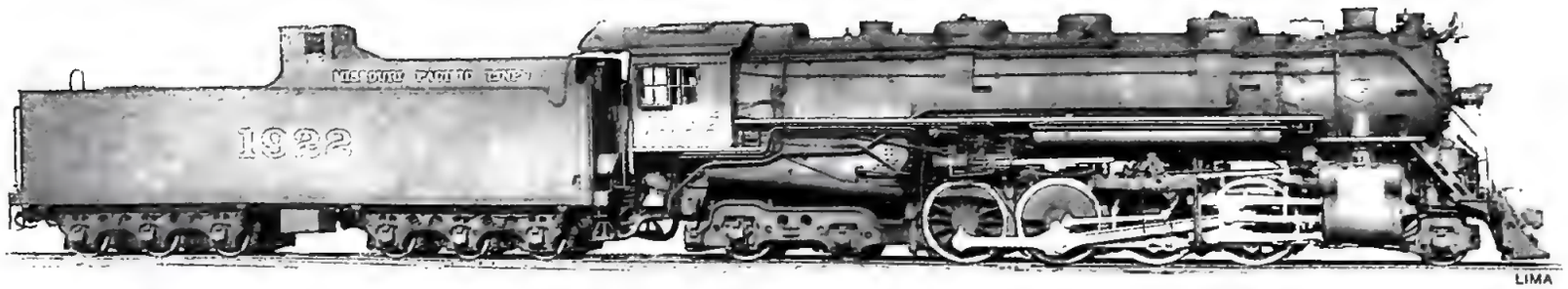
One of the people Bernet brought with him from the NKP was William Black, who had been the chief of motive power there. In collaboration with Alco and Lima, he led a design team to develop the new freight engine needed by the Erie: a high-speed 2-8-4. All prior Berkshires—those built by Lima and the copies from other builders—were not fast engines. To achieve the desired higher speeds, the Erie specified that its new engines have 70-inch driving wheels, not the 63-inch drivers used on previous 2-8-4's. This larger wheel was now big enough to hold the additional counterweight needed to balance it for operation at 60 mph and above. The Erie Berkshires mated a powerful boiler with high-speed running gear, thus marking a major milestone in the development of the 2-8-4.

Erie's first orders went to Lima and Alco, with each supplying 25 engines in 1927. The boilers of each group were identical, but there were some significant differences in the valve events and running gear. The Alcos were full-stroke engines and had a Commonwealth cast-steel trailing truck. Lima's Berkshires had the articulated trailing truck and 60 percent limited cut-off. However, to achieve the same rated tractive force as the Alco engines, Lima raised the boiler pressure to 250 psi vs. Alco's 225 psi.

The Lima engines tipped the scales at 457,500 lbs., the heaviest yet for a Berkshire. Additionally, with the generous clearances on the Erie (a legacy of the road's original gauge of 6 feet) the engines were physically imposing. They reached a height of 16 feet 4 inches above the rail and were 11 feet 2 inches wide. In 1928, Baldwin delivered a further 35 2-8-4's, also full-stroke engines. Finally, in 1929, the Erie received another 20 engines from Lima, giving the carrier a total of 105 Berkshires—the greatest number purchased by a single railroad. They would

CHARLES FELSTEAD COLLECTION

CHICAGO & NORTH WESTERN Bell ringing for a back-up move, 10-year-old J-4 2803 is at Proviso Yard, Chicago, in 1937. C&NW's dozen Berks were the first with cast, rather than built-up, trailing trucks.



LIMA

MISSOURI PACIFIC The last 2-8-4's of the A-1 mold, MoPac's 30 BK-63's also were similar to C&NW's J-4. Nos. 1121-1125 worked a quarter century, but MP rebuilt 1901-1925 into 4-8-4's in the early 1940's.

be the road's last new steam power.

Erie's Berkshires transformed the railroad from a drag-freight operator to a very competitive high-speed bridge route. Berkshires were placed in service between Marion, Ohio, and Jersey City, enabling the establishment of new freight schedules offering third-morning deliveries for Chicago–New York shipments. In particular, the Erie and the Santa Fe developed a well-oiled connection in Chicago, moving hundreds of thousands of carloads of Western produce to the East Coast. Additionally, the Erie found that its Berkshires —despite their high drivers—could work as helpers on mountain grades, and, at the other end of the spectrum, even pinch-hit in passenger service.

THE APOGEE

After having turned around the Erie, and then spending time as the president of the C&O, John Bernet again found himself at the helm of the Nickel Plate in 1933. However, it was not the same railroad that he had left in 1926. Freight schedules of other Eastern carriers had left the NKP behind. Wabash and New York Central had become very competitive with their fast 4-8-2's. The Erie, which Bernet himself had transformed into an efficient high-speed freight hauler, had emerged has a formidable competitor as well. Further, Erie and NYC had their own routes to the eastern seaboard, whereas Nickel Plate had to work through connections at Buffalo. The NKP's best freight power consisted of a fleet of USRA 2-8-2's that were no match for the fleet-footed competition.

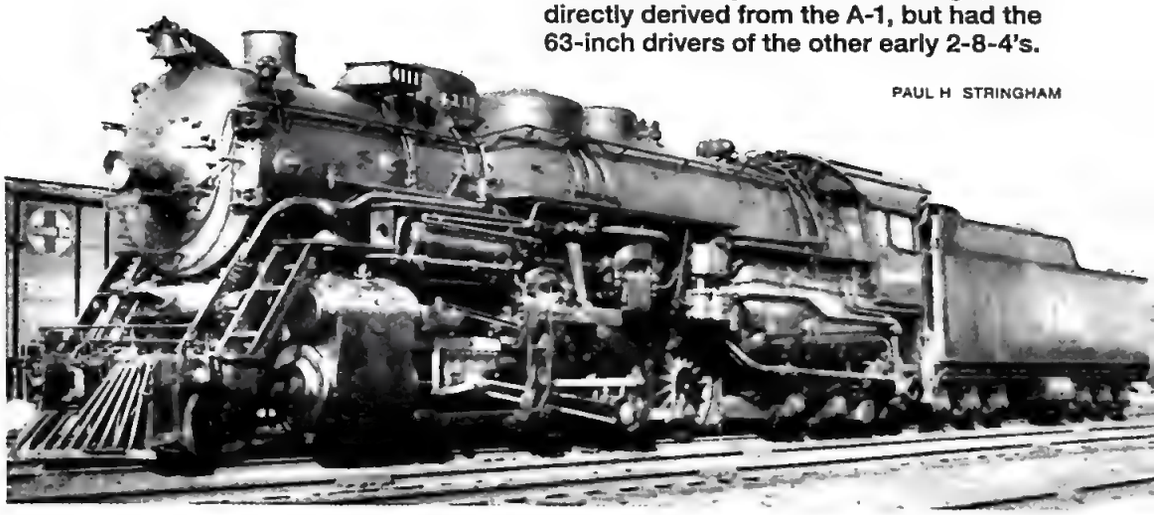
In 1929 the Van Sweringens had created a centralized engineering bureau, pooling talent from all four of their railroads. Called the Advisory Mechanical Committee, it was led by William Black. Bernet turned to Black and the AMC for help. He needed a new high-speed freight engine for the Nickel Plate.

From the beginning it was clear that the new engine would be a 2-8-4. The starting point was C&O's T-1 2-10-4, which the AMC had designed in 1930. The T-1 took the Texas type to a new level by mating a powerful boiler to 69-inch drivers. It was able to lug heavy drags or move with alacrity, as the situation demanded. Black's design team quite literally scaled down the T-1 into a Berkshire while retaining its most important features.

Like the T-1, the new engine had a combustion chamber, the first Berkshire so equipped. To accommodate it, the boiler-tube length was shortened to 19 feet and the grate area reduced to 90.3 square feet. These were excellent tradeoffs to gain the greater firebox furnace volume necessary for the complete combustion of fuel. Two thermic syphons were placed in the firebox. Like the T-1, the new Berkshire had a 34-inch stroke. This had several benefits. First, the engine got into its peak horsepower range at a lower speed. Second, it permitted the use of a small piston diameter of just 25 inches. This reduced the piston's reciprocating weight and minimized clearance-volume losses. (Clearance volume is the space between the pis-

SANTA FE Loyal Baldwin customer AT&SF turned to the Eddystone, Pa., builder for its Berkshires. They were a new design, not directly derived from the A-1, but had the 63-inch drivers of the other early 2-8-4's.

PAUL H. STRINGHAM



ERIE The third fiddle in the New York–Chicago market was the first of all roads to have fast Berkshires. Built in 1929, S-4 3389 was from Erie's final order, which brought the road's total to 105 2-8-4's.

LIMA

ton and the cylinder head at the end of the stroke, plus the passageway leading to the valve. Steam filling this void does no work; it is a source of losses. This space can represent as much as 10 percent of the cylinder volume.) Lastly, limited cut-off was discarded in favor of a full stroke.

Upon completion of the design effort, NKP solicited bids. The order went to Alco, which delivered 15 engines in 1934. Ten of them were put to work between Bellevue, Ohio, and Chicago, and the other five worked between Cleveland, Lima, and Frankfort, Ind. All acquitted themselves admirably in high-speed freight service. During World War II the Nickel Plate expanded its fleet with an additional 45 2-8-4's—this time from Lima. Then, in 1949, after testing diesels and rejecting them, NKP took delivery of 10 more Lima Berkshires. These were the very last 2-8-4's built and the last steam locomotives built by a commercial builder for use in America. The very last, No. 779, is preserved near its birthplace in Lima.

OTHER AMC ENGINES

Toward the end of the Great Depression, the 506-mile Wheeling & Lake Erie found itself in need of new power. The railroad was familiar with the Berkshire type, as it had a Youngstown–Toledo run-through agreement with the Erie, and Erie 2-8-4's were regular visitors. The Wheeling arranged to borrow an NKP engine to see whether an AMC Berkshire could also handle the road's heavy mineral traffic. It was found to be more than capable of handling ore and coal drags in the rolling hills of southeastern Ohio, so the Wheeling ordered 10 2-8-4's from Alco, which delivered them in 1937. Since the Timken Roller Bearing Co. was a key on-line customer, all locomotive and tender axles had rollers, the first Berkshires so equipped. In three more orders through 1943, the Wheeling acquired an additional 22 Berkshires. In 1949, NKP leased the Wheeling, and the smaller road's 32 engines were added to the Nickel Plate 2-8-4 fleet.

Also in 1937, the Pere Marquette Railway took delivery of 10 Lima Berkshires. They were a slight departure from the original AMC design, with 26x34-inch cylinders that raised the tractive force to 69,350 lbs. To keep the adhesion ratio at 4.0, engine weight was increased to 436,500 lbs. The 2-8-4's did a superb job handling the PM's priority manufacturing traffic across Michigan, and the railroad returned to Lima for 29 more, which were delivered in four orders through 1944. Of these, 20 came equipped with trailing-truck boosters, giving the engines a rated tractive effort of 83,750 lbs. These were the first AMC engines with boosters.

During 1942, Lima expanded its production line of NKP engines to include 10 for the Richmond, Fredericksburg & Potomac. Under the hood, these were stock AMC engines, but externally they had some details changed so they would resemble other RF&P power. The differences included the sand dome, cab, and the inside-bearing pony truck.

Chesapeake & Ohio, following the lead of its subsidiary Pere Marquette, began assembling its own fleet of Berkshires in 1944. All came with 26-inch-diameter cylinders and trailing-truck boosters. Through 1947, C&O acquired a total of 90 2-8-4's—70 from Alco and 20 from Lima. They were initially put to work hauling coal trains along the New River Gorge in West Virginia, but could later be found all over the railroad, handling everything from hot manifests to heavy passenger trains in the mountains. After the PM was merged into the C&O, the latter road became the owner of the largest fleet of Berkshires: 129.

After World War II, a change of management brought some former C&O (and NKP) men to the helm of the Virginian Railway. One of the new team's first acts

ATSF to W&LE: the 611 2-8-4's

RAILROAD	CLASS	ROAD NOS.	QUANTITY	BUILDER	YEAR	NOTES
ATSF	4101	4101-4114	15	Baldwin	1927	
B&A	A-1a	1400-1424	25	Lima	1926	
	A-1b	1425-1444	20	Lima	1926-27	
	A-1c	1445-1454	10	Lima	1930	
B&M	T-1	4000-4024	25	Lima	1928-29	1
C&O	K-4	2700-2789	90	Alco, Lima	1943-47	
C&NW	J-4	2801-2812	12	Alco	1927	
DT&I	-	700-705	6	Lima	1935-39	
ERIE	S-1	3300-3324	25	Alco	1927	
	S-2	3325-3349	25	Lima	1927	
	S-3	3350-3384	35	Baldwin	1928	
	S-4	3385-3404	20	Lima	1929	
IC	-	7000-7049	50	Lima	1926	2
	-	7050	1	Lima	1924	3
L&N	M-1	1950-1991	42	BLW, Lima	1942-49	
MP	BK-63	1121-1125	5	Alco	1928	
	BK-63	1901-1925	25	Lima	1930	4
NKP	S	700-714	15	Alco	1934	
	S-1	715-739	25	Lima	1942-43	
	S-2	740-769	30	Lima	1944	
	S-3	770-779	10	Lima	1949	
NS	-	600-604	5	Baldwin	1940	
PM	N	1201-1215	15	Lima	1937	5
	N-1	1216-1227	12	Lima	1941	6
	N-2	1228-1239	12	Lima	1944	6
P&LE	A-2a	9400-9406	7	Alco	1948	
RF&P	-	571-580	10	Lima	1943	
TH&B	A	201-202	2	Montreal	1928	
VGN	BA	505-509	5	Lima	1946	
W&LE	K-1	801-832	32	Alco	1937-42	7

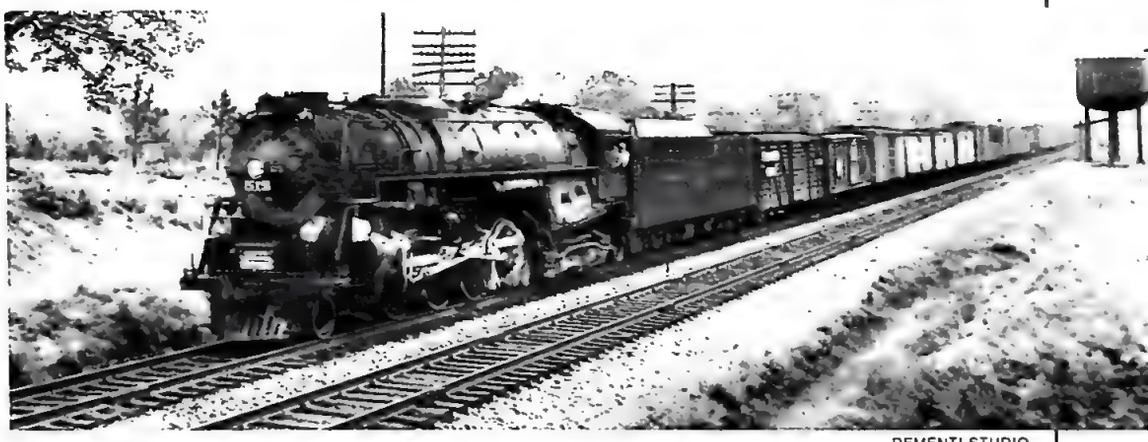
Notes:
1) Seven to ATSF 4193-4199, 10 to SP 3500-3509, 1945. 2) 7038 rebuilt to 4-6-4 No. 1, 1937. 3) Ex-Lima A-1 No. 1. 4) Rebuilt to 4-8-4's 2101-2125, 1940-42. 5) To C&O 2685-99, 1947. 6) To be C&O 2650-61, 2670-81, not renumbered. 7) To NKP 801-832, 1949.

AMC *action*

PERE MARQUETTE West of Porter, Ind., PM ran on NYC into Chicago, and here's N-1 1227 rushing east through Gary; it's May 1948, nearly a year after the C&O acquired PM and its 1200's. In '49, NKP got W&LE's AMC Berks through merger.

B. ANDREW CORSINI

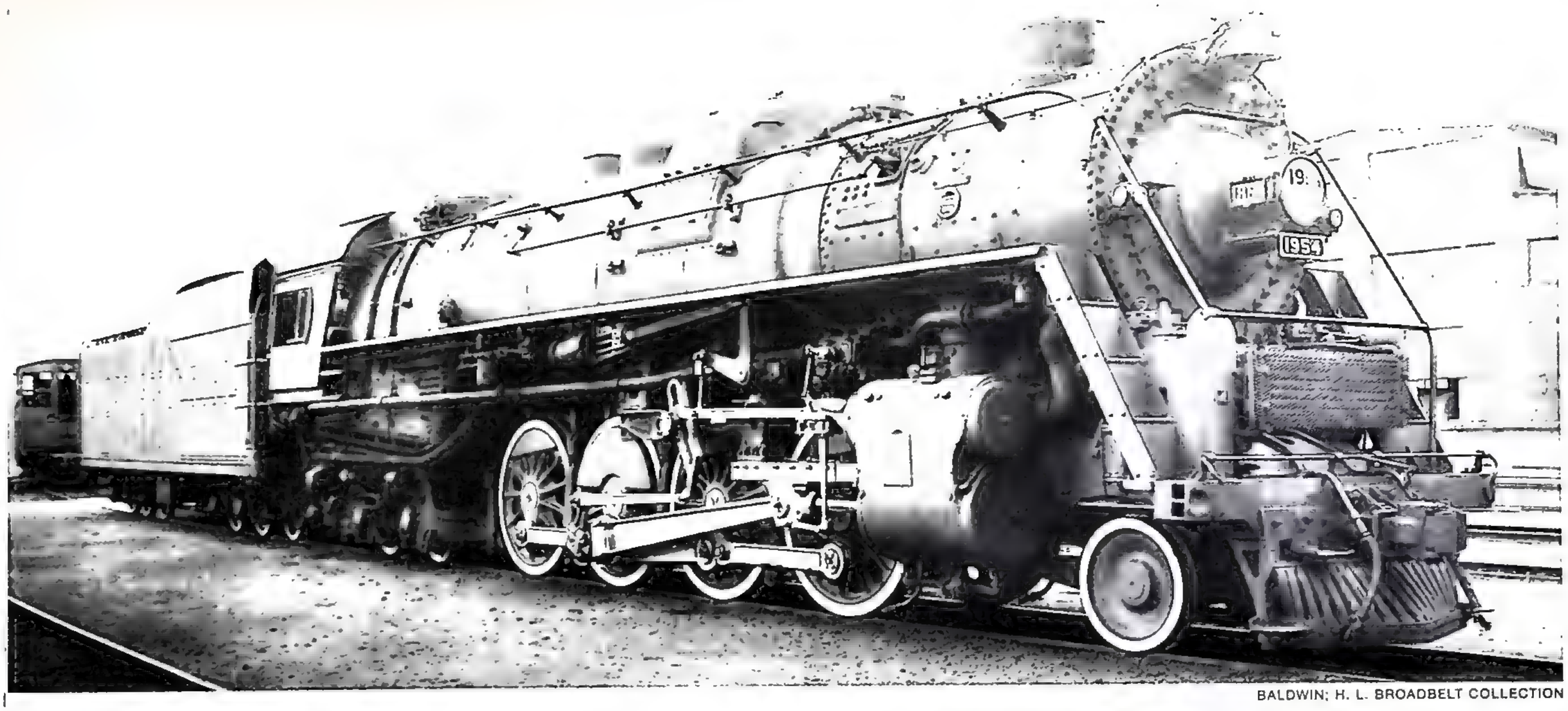
RICHMOND, FREDERICKSBURG & POTOMAC Though not a Van Swearingen road, RF&P had 10 Berks built to NKP specs during World War II. Train control box, cast pilot, and raised cab-side numbers gave them the RF&P look.



DEMENTI STUDIO

RAIL PHOTO SERVICE: GENE L. HUDDLESTON

CHESAPEAKE & OHIO From the front, C&O's K-4's were as distinctive as the name the road gave to them: Kanawha. Nos. 2771 and 2755 meet on the Coal River branch south of St. Albans, W.Va. The Virginian Railway's five 2-8-4's were virtual copies, but they lacked boosters.



BALDWIN; H. L. BROADBELT COLLECTION

LOUISVILLE & NASHVILLE Only 2 inches of cylinder stroke and 20 psi of steam pressure separated L&N's "Big Emmas" from the AMC-designed Berkshires.

was to modernize the road's locomotive fleet. Not surprisingly, they adopted C&O designs, including the AMC Berkshire. The Virginian took delivery of five 2-8-4's —exact copies of the C&O engines, albeit without boosters—from Lima in 1946. They were put to work hauling manifest freight between Roanoke and tidewater at Norfolk, replacing 34-year-old 2-8-2's. They cut more than 30 minutes off the running time.

ALMOST AN AMC ENGINE

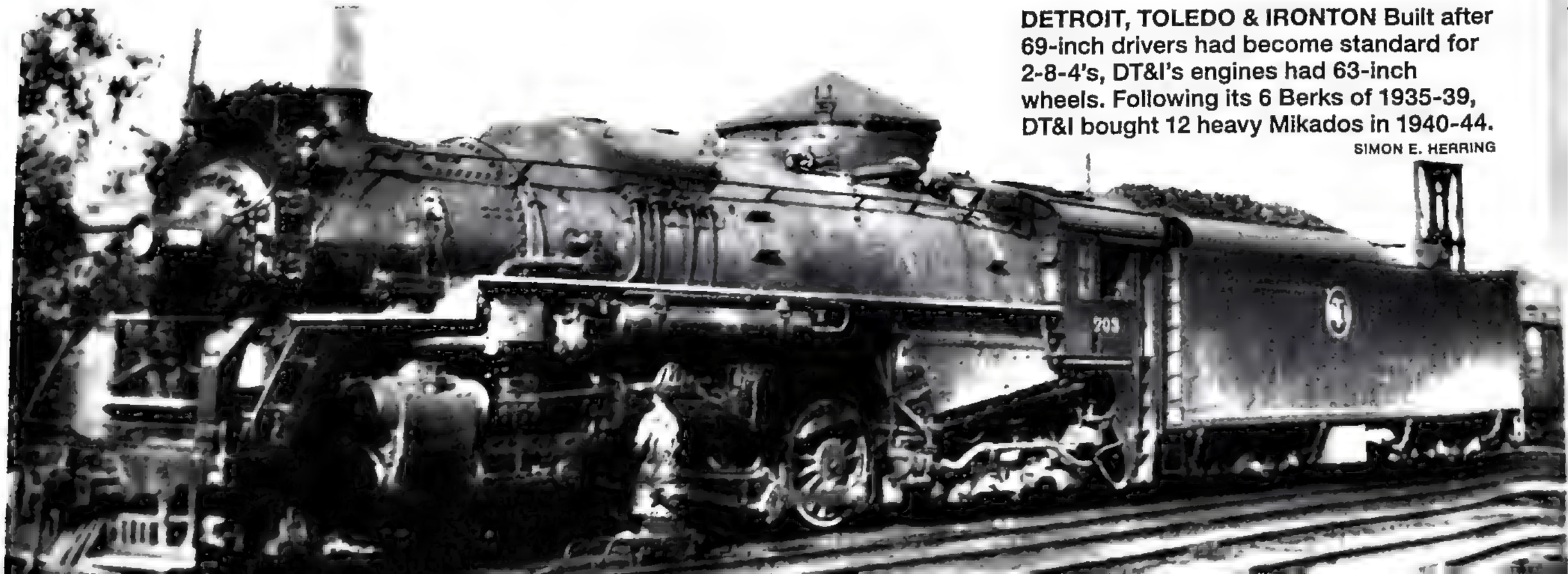
The Louisville & Nashville went shopping for a new freight engine in 1941. Its newest steam locomotives were 4-8-2's and 2-8-2's from the late 1920's, and, with traffic increasing because of the hostilities in Europe, the road was feeling the crunch. L&N had some constraints that limited its locomotive choices. Infrastructure issues prevented it from considering a large, heavy engine such as an articulated or a big 4-8-4. Consequently, management settled on a 2-8-4, and placed an order with Baldwin to design and build 14 engines. Baldwin—being the minority builder of 2-8-4's—borrowed heavily from the AMC. The key departure was in the use of a 32-inch stroke vs. the AMC's 34-inch. To achieve a tractive effort comparable to that of an AMC engine, the boiler pressure was raised 20 lbs. to 265 psi.

The L&N M-1's ("Big Emmas") proved extremely successful. Like their purebred AMC cousins, they were at home in the coalfields, on manifest freight, or heavy passenger trains. Testing with a dynamometer car showed they were capable of producing 4,500 h.p. at the drawbar. In 1944 Baldwin added another 6 engines, and in 1949, Lima delivered 22 more. These last M-1's shared the production line with the final 10 NKP 2-8-4's, bringing down the curtain on Lima's steam locomotive production.

POTPOURRI

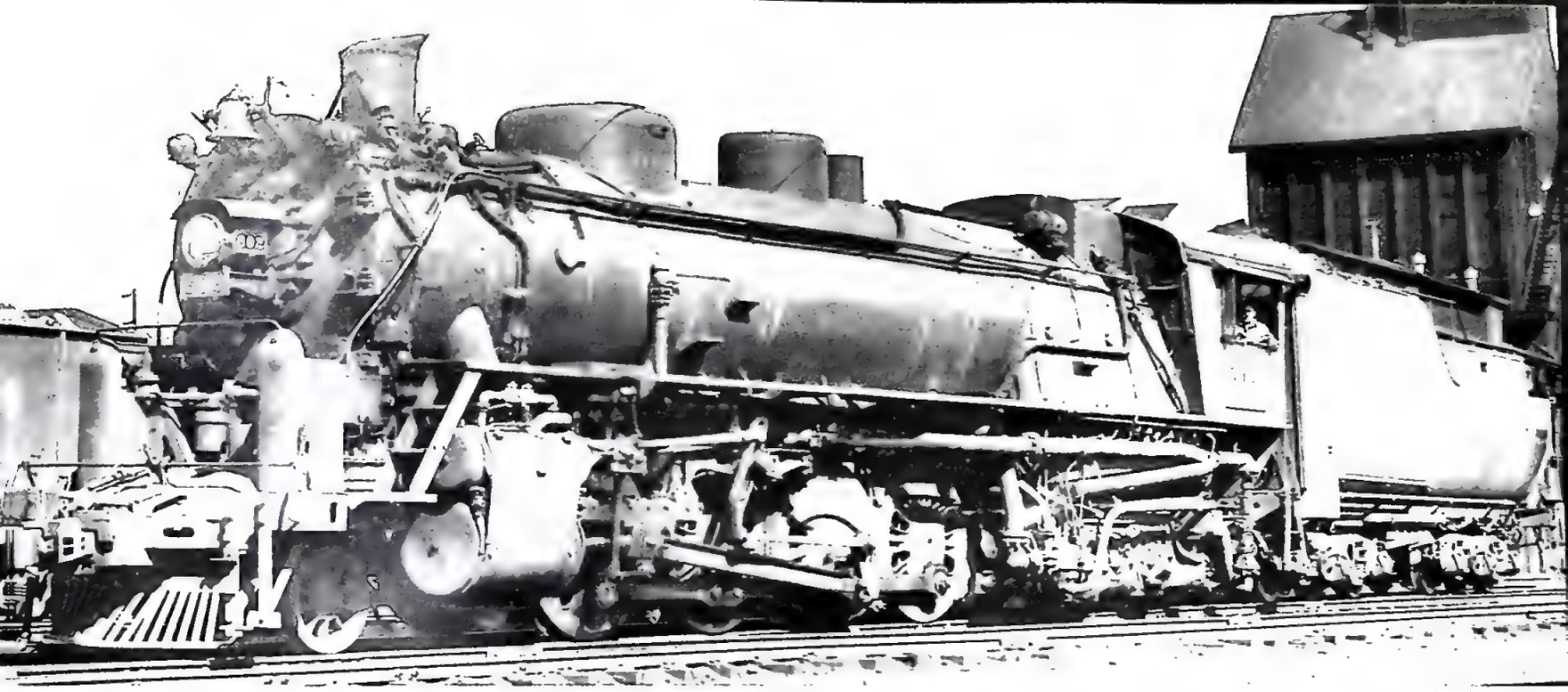
The Advisory Mechanical Committee 2-8-4 represented the high point for the wheel arrangement. After its introduction, most railroads that ordered Berkshires adopted it. Nonetheless, three did not.

In 1935, one year after the NKP engines had been introduced, the Detroit, Toledo & Ironton took delivery of four Berkshires from Lima that represented a step backward. For unknown reasons, they came



DETROIT, TOLEDO & IRONTON Built after 69-inch drivers had become standard for 2-8-4's, DT&I's engines had 63-inch wheels. Following its 6 Berks of 1935-39, DT&I bought 12 heavy Mikados in 1940-44.

SIMON E. HERRING



ERNEST SEVDE

NORFOLK SOUTHERN Smallest by far of all Berkshires, and among the last ones to be designed, were NS's quintet of 1940. No. 602 stands at Raleigh, N.C., in 1945.

with 63-inch drivers and a proportionately shorter boiler. The railroad bought two more in 1939. Although they were handsome, they did not have the same capability as an AMC engine.

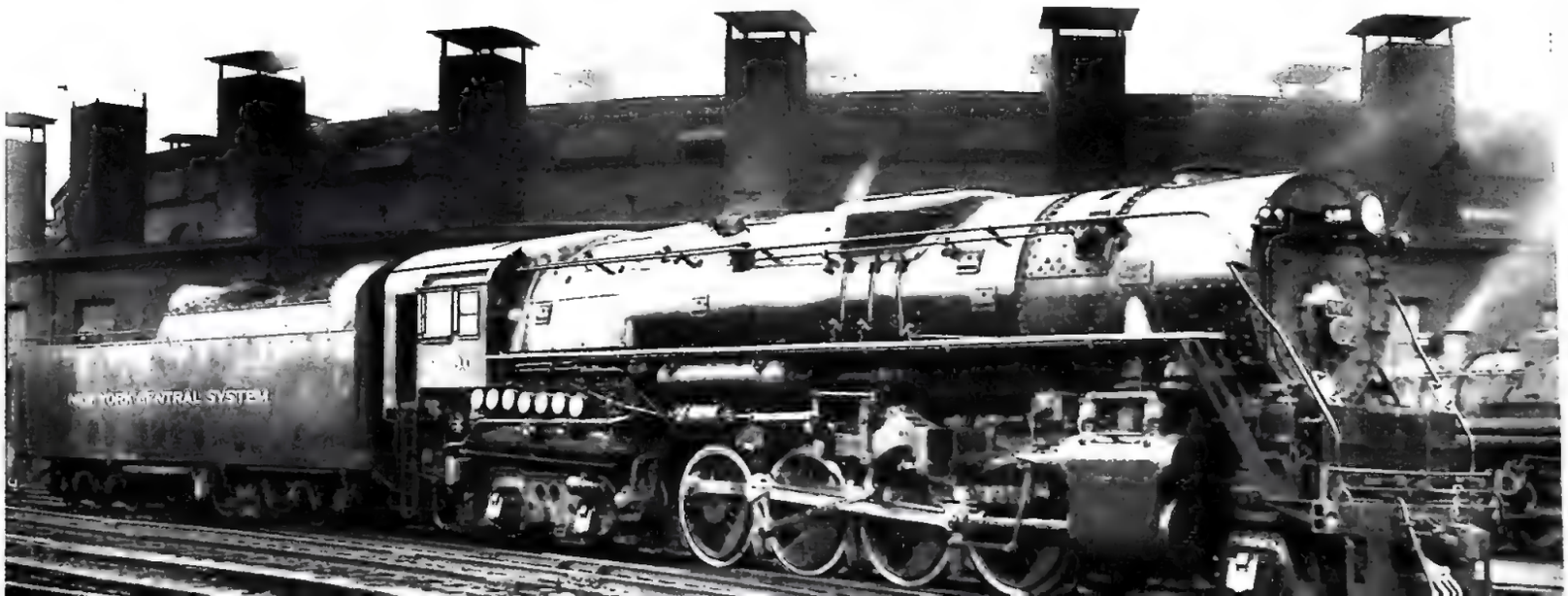
Down in North Carolina and southeastern Virginia, the Norfolk Southern Railway took delivery of five 2-8-4's in 1940 weighing almost 100,000 lbs. less than a typical AMC engine. The north end of the NS main line between Charlotte, N.C., and Norfolk, Va., was plagued by numerous weight restrictions on bridges, and its motive power had to conform to these requirements. Nonetheless, the new engines helped turn the NS into a competitive bridge route. The NS "pocket" Berkshires were notable on two counts: They were very much the smallest built, and they were the last to run in North America. After the NS dieselized in 1950, they were converted to burn oil and found a new home in Mexico, where some ran into the early 1960's.

Alco delivered its last steam locomotives—seven Berkshires of a unique design—to the Pittsburgh & Lake Erie in 1948. The big question is why this happened. Two years earlier, P&LE's parent, the New York Central, had made the decision to dieselize, yet it chose steam for its subsidiary. Further, they were a new design, with 63-inch drivers, not based on the AMC engine. They were intended solely for service on the P&LE, handling steel, ore, and coal drags. However, after the P&LE dieselized, they wound up on NYC's Big Four Division on the flatlands of Ohio, where they were ducks out of water. They could not maintain the pace of the road's speedy, 69-inch-drivered 4-8-2 Mohawks.

The Berkshire proved to be a highly versatile locomotive. It was the first of the "Super-Power" engines and it led a revolution in locomotive design. It was equally at home at the head of hot manifests, coal and ore drags, and heavy passenger trains. ■

PITTSBURGH & LAKE ERIE Perhaps the oddest 2-8-4's of all were the seven built for P&LE in 1948. This very last 2-8-4 design was in some ways a throwback to the original A-1, though much less powerful.

CLASSIC TRAINS COLLECTION



STEAM Color

ONE OF THE GREATEST: On a fine April 25, 1957, Norfolk & Western A-class 2-6-6-4 No. 1237 hurries past the neat frame depot at Blue Ridge, Va., with a westbound freight on the Norfolk Division main line. The 43 A's, built 1936-50 at N&W's Roanoke Shops, were equally at home on 125-car merchandise freights, 14,000-ton coal drags, and 70-mph passenger trains. Only two other roads had the wheel arrangement: Pittsburgh & West Virginia (7) and Seaboard Air line (10).

RICHARD H. KINDIG

LOVABLE AND LONELY: Tiny Villa Grove, Colo., 53 narrow-gauge miles north of Alamosa, is a temporary host to Denver & Rio Grande Western K-37 Mikado 497 and its short southbound freight from Salida on April 28, 1950. Converted from standard-gauge 2-8-0's in 1928 and '30, the 10 K-37's were the biggest and last of Rio Grande's 3-foot-gauge power. The final run on this 84-mile piece of the Colorado narrow-gauge kingdom took place less than a year later, on February 15, 1951.

AN *unforgettable* RIDE

A surprise trip aboard a Pennsy K4 remains a treasured memory after 50 years

BY **DON STOTT** • PHOTOS BY THE AUTHOR

It is a glorious thing to watch a train being pulled by a steam locomotive of any size, and at any speed. But large locomotives, at high speeds, are especially satisfying. I am also able to relate that riding in the cab of a large engine running at high speed is an enormous, indescribable thrill. I learned this 50 years ago, aboard a Pennsylvania Railroad K4s Pacific.

Growing up in Washington, D.C., I spent much time either riding trolleys or watching trains. When I was about 12, I got a ride on a steam locomotive near the Benning Carbarn of Capital Transit. I was riding trolley cars between the corner of 14th Street and New York Avenue and Seat Pleasant, Md.—a favorite trip of mine. As we approached Benning, I saw a Baltimore & Ohio 0-6-0 working, signaled to the trolley motorman that I wanted off at the next stop, got off, and walked over to the B&O tracks. The engineer invited me up into the cab, and I enjoyed a marvelous hour riding up and down the tracks, switching freight cars. It was certainly a thrill for a 12-year-old, but small-time.

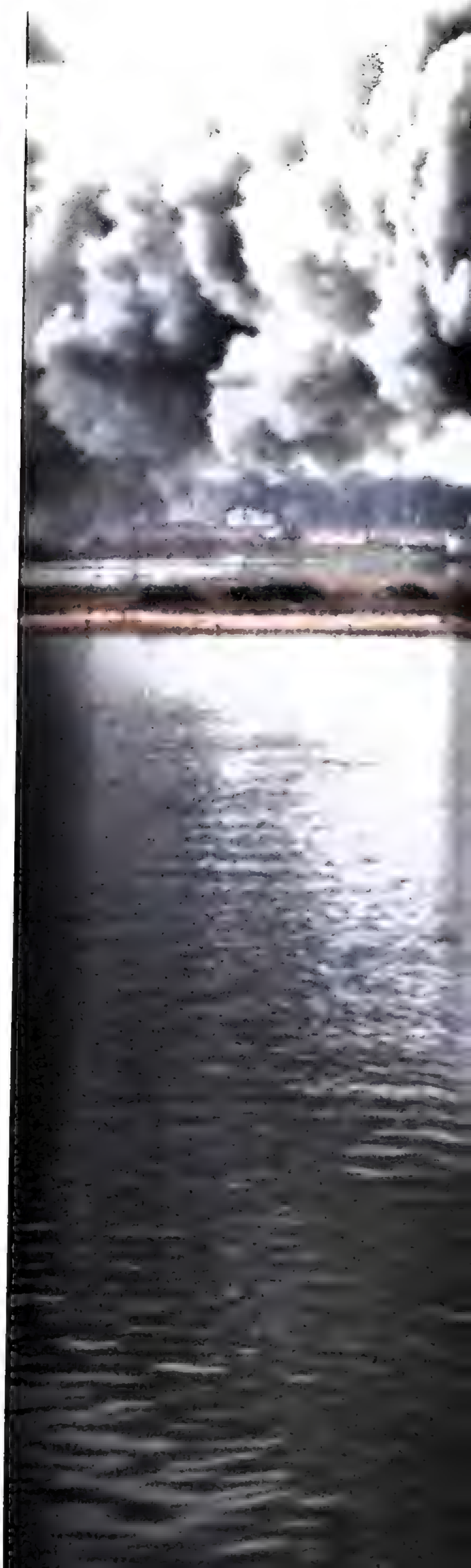
The big-time came in 1956, when I was 22. I had learned that Pennsy K4's were regularly pulling commuter trains on its jointly operated (with the Central Railroad of New Jersey) subsidiary New York & Long Branch, from Bay Head Junction, N.J., up the coast to South Amboy, where GG1 electrics took over for rest of the way into Penn Station, New York. It was one of the last steam operations on the PRR, and it wouldn't last much longer.

A buddy of mine, Bob Flack, and I decided to go see for ourselves, so the two of us piled into my 1952 Chrysler and headed up to Bay Head. It was February, and cold. Sure enough, there were K4's in the yard, and a doubleheaded train was about to leave. What a find!

Bob suggested that we should ask for a cab ride. My reaction was, "Sure Bob—fat chance!" Undeterred, Bob walked up to the second engine of the doubleheader and shouted at the engineer that we would love to ride in his cab. "Sure, come on up," was his reply. You could have knocked me over with a feather.

We climbed up, and were greeted by the hogger, who was a small man about 5 feet 5 inches in height. In his mouth was a great big cigar, which he took turns chewing and smoking. He said we were welcome, but when we passed the yard office, we must duck, because cab rides were against the rules. We readily agreed, and within a few minutes the two engineers whistled off and moved the train slowly into the station to load passengers.

After loading, the head engine whistled, ours replied, and we were off. The stubby engineer actually had his legs curled under him so he could adequately see out of the cab window. Sander on, reverse lever in the corner, throttle jerked out, the trip began—and in no time at all, we got up to 60 mph. The noise was deafening. I looked out the gangway, and in front was the other K4, pulling for all it was worth, as were we. The rods were going up and down so fast that they were a blur. Whistles moaned at crossings,



Not long after his thrilling cab ride, author Stott climbed atop the Manasquan River drawbridge at Brielle to catch K4 830 going all-out with a northbound train.

water in the tender jostled and splashed, and the fireman worked the stoker and injector to keep steam pressure up. The engineer was chewing on his stogie, leaning out the cab window with his goggles over his eyes and neckerchief around his neck to ward off cinders.

This little guy, chewing on a cigar and sitting on his legs so he could see, was manhandling 230 tons of swaying, jerking, smoking, roaring steam locomotive as if it were a toy. His left hand was resting on the throttle, right arm leaning on the cab window's padded arm rest, and that K4 was putty in his gloved hands. Every once in a while, he would glance at the pressure and water gauges to be sure his fireman was doing his job correctly, and adjust the reverse lever, but mostly the concentration he showed was amazing. Looking back from the gangway, I could see the 13 cars rocking along nicely, the passengers headed to Manhattan giving little thought to what was going on at the head of their train.

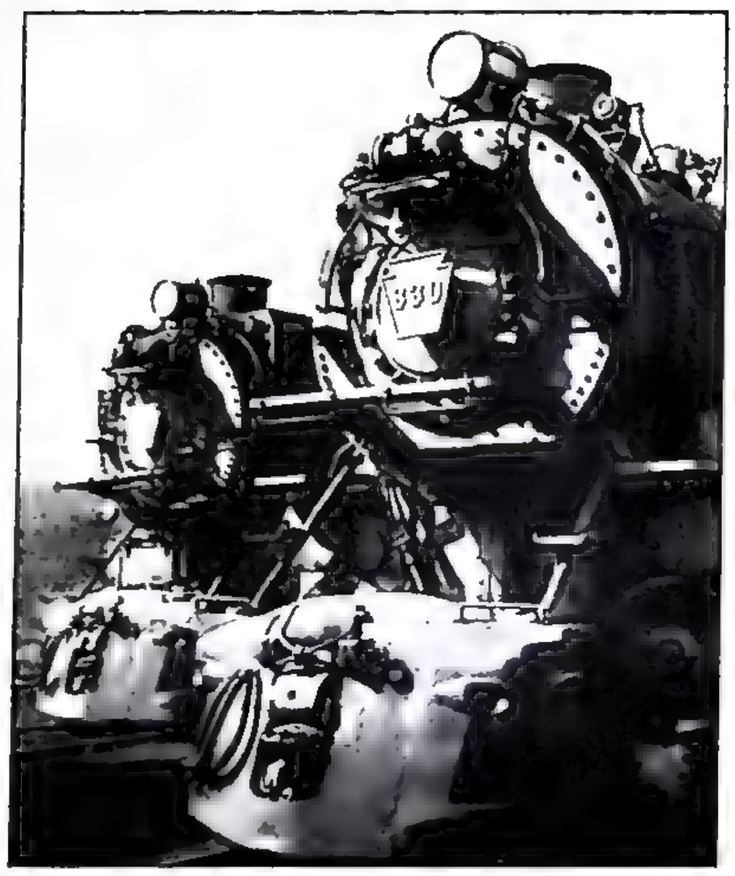
We stopped at several stations to pick up more passengers, and then were off again, seemingly at every mile per hour those two K4's could muster. Brielle, Manasquan, Sea Girt, Asbury Park, Red

Trailing a B60 baggage car and six P70 coaches, K4 5471 powers out of Manasquan with a southbound for Bay Head.

Sad day at South Amboy

The date was November 4, 1957. The phone in PRR Engineman Charlie Hess's comfortable home in Bricktown, N.J., was ringing off the hook. Charlie answered and took a call from the crew dispatcher. He wanted Charlie for a light-engine move from South Amboy to Camden. The South Amboy K4s Pacifics were based down at Camden Terminal Enginehouse, where monthly boiler washouts and light repairs were handled, so this was not an unusual assignment. Diesels had begun displacing steam from Pennsy trains on the New York & Long Branch in April 1956, and now there were only a few K4's left there.

Charlie drove over to Bay Head Junction and hit the cushions of a northbound train for the deadhead run up the NY&LB to South Amboy, where he signed on at the enginehouse. He was informed that he had K4sa 612, which was coupled behind K4s 830.



DON WOOD

612 and 830, last K4's at South Amboy.

The two engines had arrived at South Amboy earlier that day. The 830 came up on an early-morning train out of Bay Head, turned her train over to a GG1 electric, and headed for the engine terminal. Engine 612 had been the regular power for 710 and 733, a pair of trains known as the *Banker* and the *Broker* that operated in and out of PRR's Exchange Place Station in Jersey City. Because their runs did not include New York's Penn Station and the Hudson River tunnels, 710/733 ran with steam all the way; 710 didn't even stop at South Amboy.

This day, the crew on 710/733 was told at Bay Head that Camden had called, telling the dispatcher to scratch the 612 on 710 and send her on another job—one that required an engine change at South Amboy. When 612 arrived at South Amboy that morning and cut off, no one knew that it had just completed the last steam run on the NY&LB.

On the deadhead move later in the day, Charlie Hess's fireman on the 612 was Russ Clayton; the 830 had Andy Yuhas firing for Al Roland. They whistled off at 5:30 p.m. for Camden. Charlie, as fireman on the trailing engine, was aboard the last K4 ever to leave South Amboy, which had become synonymous with the great 4-6-2's in recent years.

On arrival at Camden, 60 miles south, the two crews spotted the engines on the inbound pit track, and noted there were several K4's steaming softly on the ready tracks. Seven days later, one of these, No. 5351, would make Pennsy's last steam passenger run, on a short Pemberton-Camden commuter job that, unlike the long consists and fast running on the NY&LB, was anything but challenging for the 5351. The fate befalling Camden's K4's was claiming other PRR steam power as well. Before the month was out, there would be no engines in steam anywhere on the vast Pennsylvania system.—*Don Wood*

K4 1361 eases her consist around the loop at Bay Head Junction to get in position for a northbound run. Placed on display at the Horseshoe Curve in '57, she was removed in '86, saw a couple of years of excursion service, but has been out of action since.

Bank, and on we went. We had a schedule to meet, and were doing so. I can still smell that cab, hear those engines, and see that hogger with his cigar. It was a glorious ride, one I will never forget.

All too soon, we reached South Amboy. The engines, and Bob and I with them, were cut off. We stood there, filthy with soot and grime from our 37-mile, 1-hour 10-minute ride, and watched the locomotives move to a side track to be prepared for another trip later in the day. We looked at each other, and smiled the smile that comes with having had a great and unexpected time.

Bob rode on into Newark, and I went back to Bay Head Junction to get my car. I spent the next couple of days on the Long Branch, shooting slides of working K4's. In the chilly air, glorious clouds of white steam mixed with black coal smoke. Those images bring back floods of fond memories whenever I look at them.

In November 1957, the last steam power would retreat from the New York & Long Branch and all other PRR-operated lines. Our thrilling ride could never be repeated.

Today, boys and men are attracted to high-tech gizmos, music that would wake the dead, and other things we oldsters frown upon, because we treasure our memories. We remember those iron and steel, throbbing, smoke-belching, almost-human machines called steam locomotives. When we were kids, we longed to be engineers, masters of those lofty cabs, with the throttle in one hand, waving to other kids as we passed. In the age of steam, personal computers hadn't been invented, no one had gone to the moon, and we knew what was real, tangible, and thrilling. If you've never stood by the track as a giant steam locomotive roared by at 60 miles per hour, with the engineer raising a gloved hand in a wave, you just do not know what a thrill is.

No, you can keep your space shuttles and electronic toys. I'll take a stroll down memory lane with a stereo, full-color remembrance of a great ride on a K4 on that day in 1956. ■

Steam leaking from loose cylinder packings, No. 3884 rips along the NY&LB with a southbound. She's just months away from retirement, which came in May 1956.

Here's future celebrity 1361 again, making time at Brielle beneath clouds of steam from her stack and whistle. Sights like this, thrilling to youngsters in the steam age, are foreign to today's wired generation.

Farm boy to

FIREMAN

Recalling a short but enjoyable career on the left side of Erie engine cabs

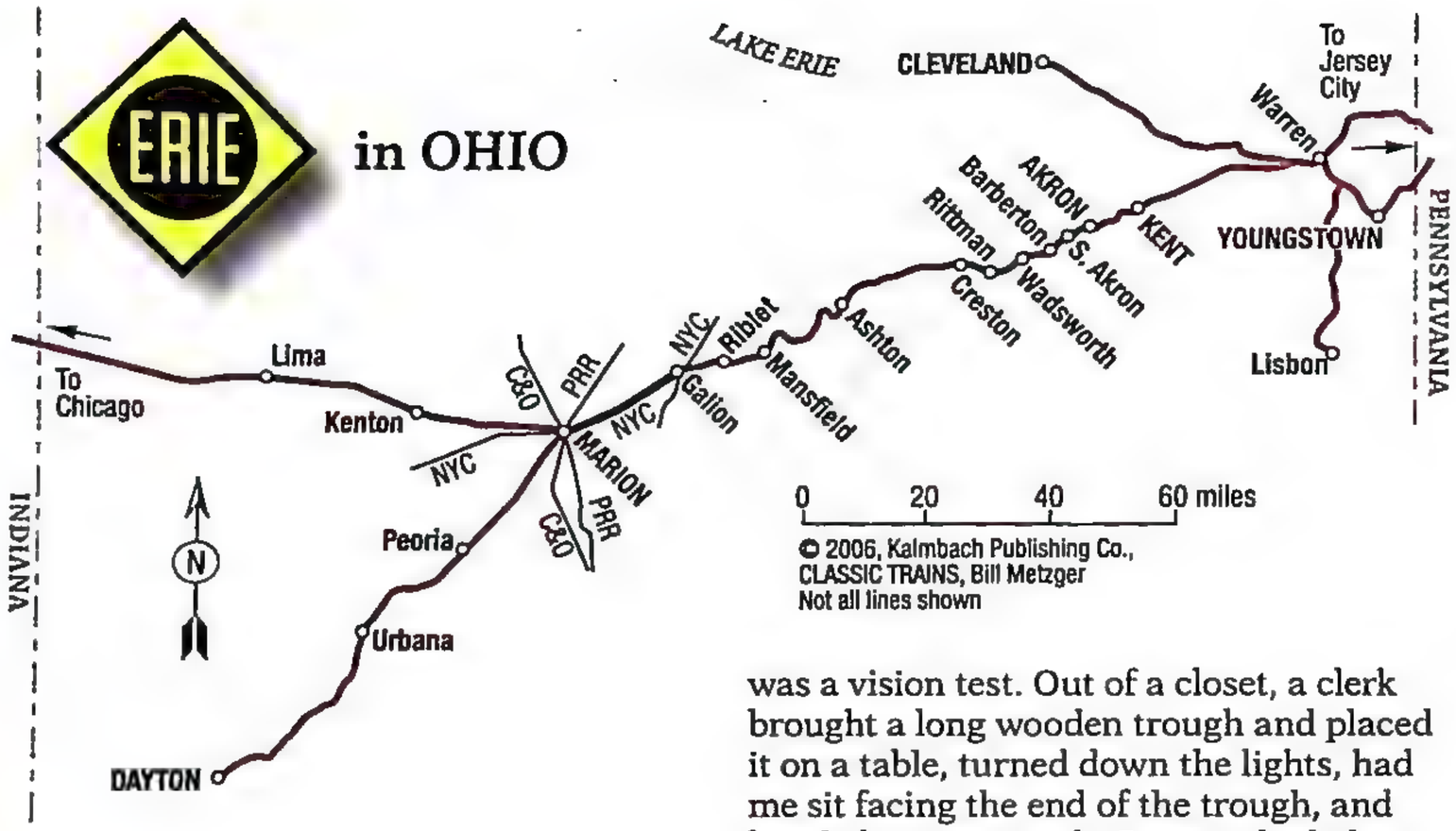
BY **CHUCK LEFEVER**

RAILROAD PHOTOGRAPHIC CLUB; H. W. PONTIN

It was the end of summer. Billy, Wimpy, and I had finished cleaning up after the last threshing job and watched Mr. Hedrick slowly drive the rig out to the road and head west to the winter storage building behind his blacksmith shop. The rig consisted of a Huber steam traction engine, with full canopy, big flywheel, water well out front, a Superior separator, and a converted buggy for supplies. As boys will do, we talked a lot about machinery and anything to do with steam engines. We were sorry to see the engine leave for the season, but there was Don Pickett's saw mill and its faithful Frick steam engine to visit in the winter. Another steam vehicle we knew about was the local doctor's beautiful little Stanley steamer. It was a delight to see this auto moving quietly along, with only a wisp of vapor betraying its source of power.

Railroads were plentiful throughout Morrow County, located just north of the very center of Ohio. We could not travel five miles in any direction without crossing a railroad. Most every trip provided a chance to see a train. And such a variety: the Big Four's Cleveland–Cincinnati main line to the east, the Erie's main line to the north, and the single-track Toledo & Ohio Central to the southwest. With a west wind, we could hear the various whistles coming from Marion, where the trains of four railroads mingled. The short whistle bursts identified New York Central's on-off whistle control that gave the engineer no chance at artistry. Pennsylvania freight engines emitted a European-like high, piercing sound. The Hocking Valley (a Chesapeake & Ohio property), with its huge Mallets and endless coal drags, won many hearts with its rich, sonorous bass-tone whistles. The Erie chime whistle was made distinct by each engineer's signature use of the pull rope. An aunt who lived near the T&OC line once said, "It's so comforting to know

Mikado 3156 clatters past Marion Union Station with a westbound headed onto the Urbana branch, on which fireman LeFever worked at the end of his Erie career.



that when I die, I'll be in the little graveyard there next to the railroad." Yes, railroads were part of our lives.

As a teenager, I decided to make railroading my livelihood. I wanted to be on steam locomotives, which meant becoming a fireman. For a farm boy in the early 1940's, becoming a locomotive fireman required only a bit of gumption and a positive outlook. What follows is the route taken by an eager lad who, having left the family farm at 17, found railroading hard to beat.

One October day, Dad dropped me off at Marion Union Station and then went to a livestock auction west of town. Upstairs I found the office of Mr. Maghee, superintendent of the Erie's Kent Division, who said he had only a minute. In our brief talk I learned I had to be 18 to be hired as a fireman, but I could learn about the railroad and its motive power by working in and around the enginehouse in the meantime.

At the roundhouse, I found the parts shop and met the manager, who asked how much I weighed (120 lbs.), would I live in Marion (yes), and did I have a Social Security card (no). Nearby on a two-wheeled handcart was a large hunk of metal. The manager asked me to place it on a workbench. The metal turned out to be one-half of a locomotive wheel bearing, weighing about the same as a full bushel of wheat. Using my legs rather than my back, it was an easy lift. The manager said, "Good job," and told me to show up Monday with leather gloves and steel-toed shoes.

My job often took me into the roundhouse, so I learned something about locomotive repair, the inside of fireboxes and boilers, and the like. As I neared 18, I was sent to see Mr. Woodward, the road foreman of engines. He asked a few questions and had me fill out a one-page form. Next was a vision test. Out of a closet, a clerk brought a long wooden trough and placed it on a table, turned down the lights, had me sit facing the end of the trough, and handed me two cords. I was to look down the trough and line up the two pegs sticking up. I tugged at the cords and could see that the pegs moved. I did this three times. Then out came a wooden box with several holes in one side. In each hole was what looked like tufts of wool fibers of different colors. When a slide was moved one way or the other I had to identify the yarn color. After I completed that test, Mr. Woodward said, "It is likely we will meet again," and shook my hand.

A new man had to make student runs to see engine crews at work, get an idea about the routes the division covered, and become used to the sounds and language of railroading. So, three days after my 18th birthday, I was ready when the phone call came: "Come to the caller's office at 7:30 Wednesday morning. This will be to Kent on freight No. 98. We'll get you back to Marion on something." This signaled the end to my parts job and a big step toward becoming a fireman.

Engineer Ben Stine and fireman Hank Ward were the crew for the huge, beautiful Berkshire on 98. The train was solid reefers bound for Jersey City. Five more trips to Kent, a couple on Mikados on the branch line to Urbana, plus a one-way ride aboard the *Erie Limited*'s K-5 Pacific, ending with a midnight deadhead home on the westbound *Limited*, completed this part of my training. But more education, reading, classroom work, and exams lay ahead.

My first paying job—the midnight to 8 a.m. westbound trimmer in Marion Yard—soon came. I arrived early and learned I had this same job for the next five nights! Working for the railroad was not just a job, it became a way of life. The crew change was made at a spot between the roundhouse and hump; there I found engine 243, a squat 0-8-0 with a Vanderbilt tender, one of 55 such switchers Baldwin built between 1927 and 1930 to a USRA design. I examined the inside of the cab to see how different it was from a road engine. There was no stoker, but a handy scoop shovel, a foot-operated air valve to open the firedoor, and, on the right side, a hanging throttle just like the Berkshires had. I looked into the firebox and noted its smaller size compared with the road power. Yes, I would be able to reach all the corners. I found the blower valve, checked the water glass, then climbed onto the tender and found a good supply of coal and the tank close to the full mark.

Soon the engineer, Ira Kimble, climbed into the cab, asked my name, and whether we needed coal or water. When I said we were in good shape, he laughed and said, "Buck must have gotten religion." (It seems that Buck Snyder, fireman on the 4-to-midnight trick, had often left the tender a bit short on essentials.) This being my first hand-firing experience, Mr. Kimble was very helpful. Our job was to back-haul trains that had come in from the east, push them over the hump for classification, assist in making up westbound trains, and, as the last thing each morning, pull cars from the C&O transfer track. We began by moving cars from the yard tracks, sometimes one car and sometimes a sizable cut, building a general merchandise train for Hammond, Ind., that departed at 4:45 a.m.

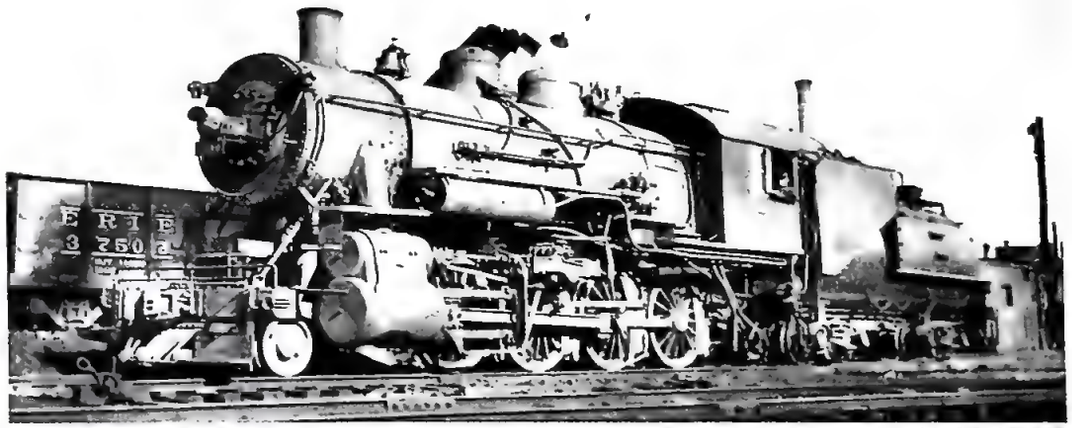
Mr. Kimble proved to be a fine teacher. He schooled me how to stand—on the balls of my feet, a bit to the left of the firedoor, about five feet back. With practice I developed a rhythm that I remember to this day. Hand-firing, I found, was much like dancing—keeping your balance ensured that the engine deck would not move out from under you. After a few nights of hand-firing, it dawned on me why my farm experience with a scoop shovel helped me get hired in the first place.

Later, I learned another aspect of hand-firing: steam engines, especially the switchers, made a great kitchen—well, at least a grill. From other crewmen I learned the skills of cooking a meal on a cleaned scoop shovel. But there were downsides to firebox cuisine, as I discovered on a cold January 1st when Fred Hanna and I were working the hump trimmer.

We had decided to celebrate the New Year with a version of Bananas Foster. The dish had been prepared at home, and the cold weather kept it firm. We were stopped on what seemed to be a safe track. Topping this elegant dessert with chocolate, we placed it on the shovel and thrust into the firebox. At just that moment, a boxcar got loose and came down the slope, hitting us a hefty blow. The Bananas Foster shot off the shovel and struck the firebox arch. The hit from the car caused no equipment damage, but Fred and I had to share a Hershey bar instead of our fancy dessert!

L. W. BULLOCK

Fireman LeFever's first paying job was on a sister to C-3 0-8-0 252 (above, at Johnson City, N.Y.). Power for switching in Akron included old 2-8-0's of the same H-21 class as No. 1739 (right, at Newburgh, N.Y.) and Alco-GE box-cab diesels 21 and 22.



DAVID R. CONNOR

BERT PENNYPACKER COLLECTION

The Marion extra board provided crew fill-ins for distant yards, usually for a week. I didn't mind such assignments; being away from home was part of the adventure for a young, single man. My favorite place to go was the Akron yard, which was close to town and had good lodging and cafes nearby, aside from the closest eatery, the misnamed Sanitary Kitchen.

Akron had an interesting variety of switching power. The mix included H-21 Consolidations 1698 and 1703, a K-4 light Pacific, and other odd, temporarily assigned steamers. The 1703—her number, not year built (that was 1905 or so)—most often headed west on the Rittman turn that dipped into yards at South Akron, Barberton, and Wadsworth. Akron also had two diesels, Alco-GE 100-ton box-cabs 21 and 22. Their 600 h.p. Ingersoll-Rand engines, with exposed rocker arms and springs, clattered like oily knitting needles. Usually only one of these was in Akron at any given time. They were there because the several rubber and paper companies in town did not want cinders mixed into their products. Lifting a string of cars out of the paper mill back across West High Street with one of these engines required patience—by the crew and by the waiting auto traffic. Often

Hard day on the Swipe

During World War II, the Kent Division local pick-up freight known as the Swipe could encounter problems. Although it started out with only a caboose, it might grow into a train almost of the capacity of the power assigned. This wasn't much of a problem for westbound Swipes, because past Mansfield the grades became easier, with even a slight descent from Galion into Marion. Eastbound, it was another matter.

One bright, cool April day on the Swipe, pick-ups had been heavy all the way, and our engine, Mikado 3127, was working hard. These Mikes, with their Elesco feedwater heaters sitting crosswise atop the smokebox, gave the appearance of a matronly lady with a bouffant hair-do. There was a bustle, a sense of hurry, and a touch of fluster about these 2-8-2's—quite different from the authoritative power evidenced by the Berkshires.

The afternoon varnish bound for Jersey City had passed while we were in an industrial plant siding. Now, with our heavy consist all tied together, we headed east. With a good fire, half a glass showing, and dusk falling over the oaks and pines bordering the main line, engineer Luke Arnold opened up for the hard pull ahead. He soon had things rolling at a good clip. Luke compared watches with me and our front-end brakeman, Art Willis, and concluded we would be at Sterling siding, 2.8 miles east of Creston, in time for a meal at the excellent trackside eatery. Luke's interest in regular meals endeared him to young tallow-pots like me.

Things unraveled slowly. As the grade leading up Polk Hill stretched ahead, the engine kept losing its footing. The rail looked to be dry, and keeping the sander lever wide open did not help. The exhaust slowed further after each driver spin. Finally, the train stalled. After whistling out the flag, Luke grabbed a hammer and tossed me a wrench. With Luke on the right running board and me on the left, we pounded on the sand pipes. The brakey jumped down to examine the rail and found the problem: No sand was coming out of the pipes! We checked the sand dome and found a good supply there. Luke diagnosed the problem as a plugged air line or defective valve.

Soon, our conductor, Frank Connors, climbed into the cab, saying to Luke that he had suspected trouble when he was able to walk faster than the cars. When Frank suggested it would be necessary to double the hill, Luke spat out the window and, with a few purple phrases, registered his dislike of doubling. With no alternative, however, we cut the train 20 cars back and headed for a siding.

With less tonnage to haul, the 3127 acted like a lady and did not slip once. Backing down past the first cut, we could see where the tonnage came from. First were some flatcars with Galion Iron Works heavy road rollers, painted Army green. Then came gondolas of coiled wire and cars of newsprint headed for Akron. There was more of the same in the rest of the train. An hour later, with the two cuts together, the complete Swipe sat in Nankin siding, 4 miles east of Ashland, and the conductor was calling the dispatcher on a lineside phone.

We watched Frank on the phone as trains of reefers and tank cars highballed east. Finally he reported that the Rittman turn out of Akron would come to help us. Time was passing and our hunger increased. In due course. Luke's face showed a mixture of disbelief and humor when ancient 2-8-0 1703 came backing down the eastbound main. He remarked, "Here's an engineer with an engine older than he is." It was Ed Lemon and the crew out of Akron yard. I called over to Lemon's fireman, who was ahead of me on the roster, asking how he liked "hand-bombing." Jack shouted back that he was saving money by not going to a gym. They had set off their few cars, kept the caboose, and hurried to our aid.

It was decided that the 1703 would provide sand on the grades as needed and whatever power she could muster. Used in local and branchline work, the H-21's were reliable; they had comfortable, wood-lined cabs and were good steamers. When running at a fair clip with a light load, they seemed to twitch their cab in a loping, side-to-side tail-wag. Accompanying this motion was the soft clang of the vertically hung firedoor, tapping in time with rod rotation, a pleasing sound.

This odd doubleheader proved effective. Once past the tough grades, the 1703 made a triumphal entry into Akron yard. Soon the 3127's sand-flow problem was diagnosed as an hour-long repair job. This was great news, as it meant we could finally eat. Topping off with water and asking the hostler to keep an eye on the engine, Luke led the way to the Sanitary Kitchen. To call the place modest would be charitable, but the food was hot and plentiful. When we got back to the 3127, she was fixed and ready to go. We tied up in Kent with an hour to spare.—*Chuck LeFever*

S. BOTSKO

"A matronly lady with a bouffant hair-do"—that's how Erie's Mikados with high-mounted Elesco feedwater heaters looked to the author when he was an Erie fireman. Engine 3099 bustles into Wilkes-Barre, Pa., with cars for the Jersey Central on May 21, 1949.

DONALD W. FURLER

Majestic K-5 2936 rounds a gentle curve with the eastbound *Midlander/Lake Cities* at Warren Point, N.J., in August 1942. As the Erie's top passenger power, the K-5's also worked short, fast perishables trains.

the load was so equal to the available power that you could look down from the cab and count the ballast stones.

Another reason a week in Akron was good duty was the roundhouse foreman, Russ Melling. Crews arrived early before most shifts and would sit around the stove area, enjoying discussions on a wide range of subjects. Mr. Melling, a true gentleman, acted as arbiter, rarely joining in the actual arguments. The hostler, originally from Kentucky, was Cutty Workman. Once, Cutty was holding forth in his soft twang when he was asked why he had mentioned rats. Cutty shot back, "Ah don't mean the little mousy kind, Ah mean *raht now*!"

Engineer Ed Lemon, a huge, bulky man, had used his seniority of 40-odd years to bid what he thought would be a nice noon-to-8 daytime local. But wartime traffic added a lot of overtime, and Ed constantly complained about arriving home only to find his supper cold and his wife already asleep. Charley Loy, another old-timer, apparently felt it was his place to instruct the younger men on the delicate subject of women. His approach was to regale us with examples from his own seemingly inexhaustible experiences—real or imagined. Jack Davies supplied one-liners on demand. They were good men, railroad men.

Erie's K-5's, based on the USRA heavy Pacific design, dated from 1919-26. As a student fireman, I rode the 2934 and a couple of others, but the extra board offered few passenger runs. However, my fastest trip from Marion to Kent was on K-5 2931, not with passengers but with 10 cars of Oregon cherries! These special trains of fresh fruit ran on passenger schedules and had rights over all trains except the *Erie Limited* and *Midlander/Lake Cities*.

To save time on the engine change at Marion, the locomotive that brought the train from Chicago left it sitting on the eastbound main track in the yard. Waiting for the car inspectors after we had tied on, the engineer on this trip, F. J. Hochberg, said to me, "If you want a treat, run back a couple of cars and take a deep breath—but be quick!" What a sensation! The air was perfumed with that rich aroma of ripe, sweet cherries. F.J. treated the division as a racetrack, and we arrived at Kent 25 minutes faster than the *Midlander*'s schedule!

New men soon learned about two local freight trains, the "Swipe" and the "Loafer." The Swipe mainly picked up cars, while the Loafer set off and did requested switching for customers. Working either of these runs was always instructive for me. Moving from one town to another, in and out of yards as mainline traffic allowed, one could see much more of the country and details of the railroad itself. Often it took a full legal day (16 hours) to go from one end of the division to the other (114 miles). These runs also gave us an opportunity to sample the fare at various eating places and meet local people. The food quality was generally high. Fresh produce, homemade pies, doughnuts, and thick beef sandwiches kept us well-fed and happy. The folks who ran these cafes were extra nice and accommodating to railroaders.

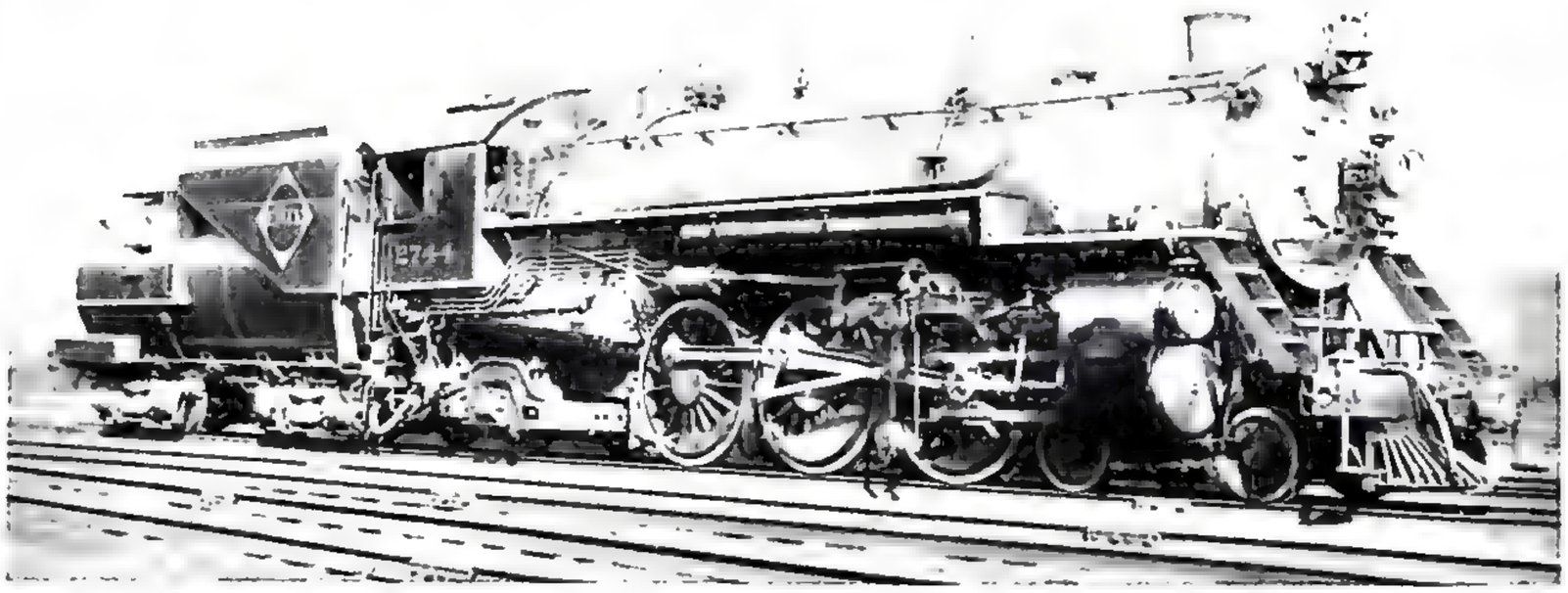
This account of my time as a fireman would not be complete without a word on the wonderful S-class Berkshires. The S-3's and S-4's, built in 1928-29, mercifully replaced the older USRA 2-10-2's as the top power on the Kent Division during the early war years. The Berkshires had both power and speed. With higher drivers, a strong booster, and large-capacity tenders, these engines tamed the division's saw-toothed grades *and* kept tonnage moving at a good clip. Whipping a long string of West Coast reefers on a fast eastbound No. 98 was a grand sight for bystanders and exciting for the crew. After a few weeks' grind at college, drawing a run on one of these great engines restored my good humor and reminded me how lucky I was.

My prime achievement as a fireman came in summer 1950, my last year at Ohio State University and what proved to be my last year with the Erie. I was able to bid a regular local run that lasted all summer. I looked on this as sort of a graduation gift in making me a full-fledged fireman.

The local ran from Marion southwest to Urbana, and on occasion to Dayton. Bill Derringer, who hired out in 1927, was my engineer and another reason for my good

ERIE

Kent, Ohio (above, during World War II) was the east end of fireman LeFever's territory. Of all the hand-fired engines he worked on, he liked the K-4 Pacifics best. No. 2744 is at Kent in 1930 (right); 2712 was a regular on the Urbana local freight.



G. A DOERIGHT JR.

fortune. Bill and I had worked together before, and he had urged me to bid the job.

The local was a full week's work. We left Marion at 7 a.m. Monday, stayed over in Urbana that night, returned to Marion on Tuesday, then repeated the process twice more until Sunday, when the train didn't run. We usually had K-4 Pacific 2712, fitted with smaller drivers than when she was in passenger service. Hand-fired, she was a sweet steamer, rode like a Pullman, and had plenty of power for the typical train on this flat, fairly straight line. Of all the hand-fired switchers and road engines on which I worked, I liked the trim K-4 the best.

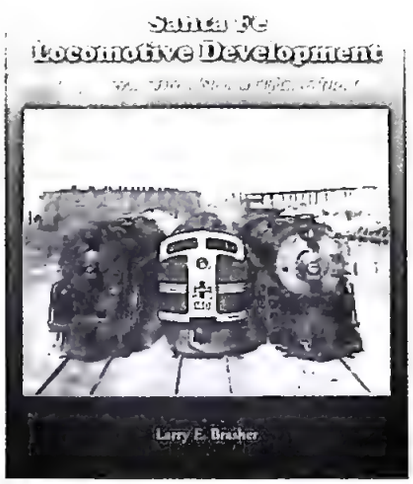
Departure from Marion was a bit complex. The Urbana "cow path" was not accessible from the west end of the yard, nor was it directly accessible from the east end without a reverse move. How fast we got out of town depended a lot on mainline activity—not only on the Erie, but also the other three railroads though Marion.

The routine was to leave the roundhouse "out" track, run to the west end of the yard, back up and tie onto our train, and wait. At a signal, Bill would back us out of the yard eastward, across the C&O and PRR diamonds flanking Marion Union Station, and into a siding by the grain elevators . . . where we would wait some more. Typically we'd have to sit until one or more Big Four freights, and perhaps a C&O or Pennsy train, too, would pass through the interlocking. When a signal finally came from the operator up in tower AC, Bill would ease us through the plant, over the Route 30 crossing, briefly onto Big Four track, and at last onto our own line to Urbana.

Out on the branch, we would set off and pick up cars carrying everything from coal to fencing, then mosey on to the next town. Our midday meal, more or less, would come at Peoria or St. Marys. Typically we would tie up in Urbana between 4:30 and 6 p.m. There the hostler took charge of the engine to get it serviced and turned for the trip back north while we headed for a boarding house and supper. Next day, it was up at 5 and back to Marion.

Although my railroad career was short, my memories are long-lived. Six decades later, I can easily recall just how a given locomotive sounded, how the cab smelled, or what the ballast looked like. My time on the Erie was when I was young and impressionable. I believe that, if suddenly placed in the cab of a K-4 Pacific or an S-3 Berkshire, I would be able to function effectively and safely. ■

Landmark Book Coming This Fall



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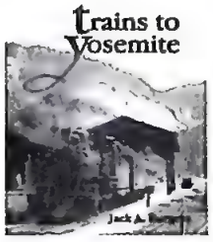

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DASHING ACROSS MICHIGAN: Pacific 5634 hustles Grand Trunk Western Detroit–Muskegon train 21 west from Durand, Mich., in April 1958. The light 4-6-2, patterned after a USRA design, is the last of three 1929 Baldwin K-4-b's with vestibule cab, all-welded tender, and extended smokebox with a Coffin feedwater heater. The trio joined five K-4-a 1924 Baldwins, 5627-31, one of which, 5629, had a Chicago fantrip career in the 1960's, but was cut up in '87. Sister 5632 is displayed in Durand.

WILLIS A. M. CALEB, KRAMBLES PETERSON ARCHIVE

STREAMLINER AT REST: Engineer and fireman of a streamlined 4-8-4 chat at a stop somewhere on the GTW circa 1956. GTW's parent, Canadian National, got five distinctive U-4-a Northerns, 6400-04, from Montreal in 1936; GTW's similar U-4-b's, 6405-09, came from Lima in '38. The U-4-b's handled Chicago–Port Huron mainline trains until April '57, when they went to the Detroit Division. The 6405 was the last active streamlined 4-8-4 in the U.S., on Detroit-Pontiac commuter runs in 1959.

CROWN STEAM 1954

Ontario vacation glimpses of
Canadian steam's daily routines

PHOTOS BY **MERT LEET**

Two and a half years after they were married, and almost six years before their first child was born, Mert and Mary Leet in October 1954 took a vacation trip by auto from their west-suburban Chicago home up along the length of Lake Michigan and over into northern Ontario. They wound up in the Niagara Falls area before heading back home.

Five decades hence, Mert doesn't remember many details of the trip, but notes that "I was getting mileage from the company [Crown Can, later Crown Cork & Seal, for which he and his colleagues visited and advised food canners] on business trips, so we had to upgrade cars, and that fall, I had a brand-new 1955 Plymouth."

Photographing trains was not the top priority on this trip, but Mert admits, "We'd just hit every place that had railroad action, and I'd take pictures of what I could before moving on."

At this time, Canada's two big railways were still mostly steam-powered. He was using a secondhand Argus C3 camera, fondly remembered by many as "the brick," and had converted to Kodachrome slides from black-and-white prints a couple of years before, upon the advice of a friend in his Army unit. At the time, Kodachrome was rated at a relatively slow ASA 10; fortunately, Mert had mostly sunny days to photograph steam on this vacation.

From Sault Ste. Marie, Ontario, the Leets followed Canadian Pacific's line east to Sudbury. "East of the Soo," Mert remembers, "we thought about taking a ferry from Manitoulin Island over across the mouth of Georgian Bay, but the ferry's wait list was so long we just drove on east, toward Sudbury and then North Bay."

From North Bay, they headed south, stopping at several points to shoot Canadian National steam at work. In Toronto, he visited Union Station and took some photos out at east-suburban Pickering. His last pictures from the two big railways came south of Hamilton, as he and Mary headed for Niagara Falls.—*J. David Ingles*

HUNTSVILLE

CN 2-8-2 3218, built in 1916 for the new Canadian Government Railways, arrives with a southbound freight, passing the depot before doing some work. Meantime, 4-6-0 1368 is switching in the yard. It is among 57 engines in class H-6-g, built by Montreal Locomotive Works for Canadian Northern (CNoR) in 1912. It would be retired in 1956, five years before the last of its sisters, and like many CNoR engines, still with its original road number. Huntsville is in the Muskoka Lakes vacation region, 146 miles north of Toronto. Canadian National was created in 1919 to operate railways that had been taken over by the government, including the Intercolonial, National Transcontinental, Grand Trunk Pacific, CNoR, and in 1923, Grand Trunk Railway.

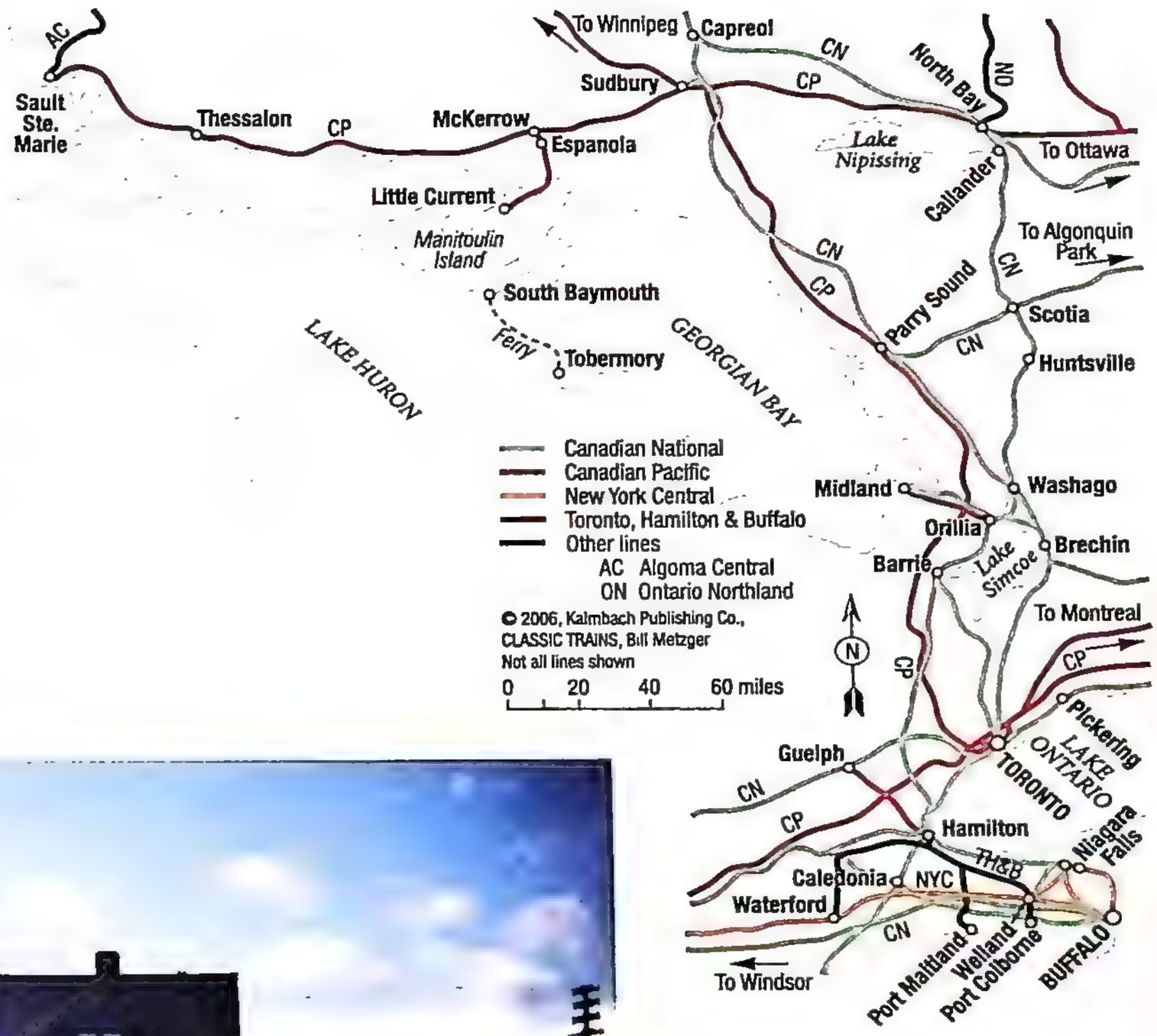
THESSALON

CPR 2-8-2 5160 works eastward local freight 88 out of Sault Ste. Marie, 48 miles away at Thessalon on the line to Sudbury. The engine is one of 75 CPR light Mikados built by Montreal in 1913 as class P1b's numbered 5020-5094. During 1926-1930, they were rebuilt and designated class P1e, with their road numbers raised by 100. The 5160 had been rebuilt in 1929 and would be retired in April 1961.

DEAN LAKE

CPR 4-6-2 1254 steams in for its 10:48 a.m. stop with Sudbury–Sault Ste. Marie train 17, which carried a through (from Toronto) coach and 8-section, 1-drawing room, 2-compartment sleeping car, plus a Sudbury–"Soo" parlor-diner. The train connected at Sudbury off Toronto–Vancouver train 3, the *Dominion*. Engine 1254, outshopped by Montreal in 1946, was one of 102 G5-class 4-6-2's built 1944-1948 to the general dimensions of the G2 Pacifics, introduced in 1906. One of 40 members of the G5c sub-class, 1254 would be retired in June 1960.

LEET'S TRAIL THROUGH ONTARIO



McKERROW

CPR 2-8-2 5458 swings east at the junction—2 miles north of the paper-mill town of Espanola, off the 38.7-mile branch from Little Current, on the north tip of Manitoulin Island—onto the Soo–Sudbury main line. The branch, built as the Algoma Eastern, didn't join the CPR family until 1930. The engine, a 1944 MLW in sub-class P2j, was one of the younger members of the 174 in the P2 class, series 5300-5473, built by Montreal, Canadian Locomotive, and CPR's own Angus Shops through the 1920's, '30's, and '40's. The 5458 lasted until September 1961.

SUDBURY

CPR 4-6-2 2404 backs away from the roundhouse at this important rail and mining city for servicing. Sudbury is just west of Romford, junction of the original Montreal–Vancouver main line with the connection from Toronto. The CLC product, which wears CPR's black freight livery, was in the 40-member G3g sub-class (built 1942-43) of the 172 G3-class dual-service Pacifics out-shopped during 1919-48 by three builders.

NORTH BAY

Canadian National 0-6-0 7353 rests at the passenger station prior to working what is likely overnight train 47 from Toronto, steaming in for its scheduled 7:30 a.m. arrival behind 4-8-4 6158, unusual for 1954, when 4-8-2's or later 6200-series 4-8-4's were the norm here. The switcher is one of 20 built by Montreal for CGR in 1919, as 876. CN's O-12 class of 0-6-0's, built by CLC as well as MLW during 1914-20 for CGR, CNoR, and CN during the latter's formative years, encompassed 105 engines (all becoming CN 7319-7423). They served well, with the last one not being retired until 1961. The passenger train was substantial, with head-end cars, coaches, and sleepers, several to be forwarded on by the provincially owned Ontario Northland Railway. Prior to his CN depot visit, Leet photograhed CPR 2-8-0 3422 at work in town [Winter 2003 CLASSIC TRAINS].

CALLANDER

CN 2-8-0 2588 pauses with a local freight at the depot, a standard Grand Trunk structure clad in stucco for insulation, in the first town south of North Bay. The Consol, built in 1907 by Montreal as 733 in GT's 616-777 series, wound up among 146 2-8-0's in CN's class N-4-a, series 2515-2660, all outshopped during 1906-11 by Alco's Schenectady and Brooks works as well as MLW. The 2588 was retired in 1960, but sisters 2534, 2601, and 2616 are preserved. By the early 1970's, 8 miles of CN's Newmarket Sub through Callander were taken up, as the parallel Alderdale Sub offered a better line into North Bay.

SCOTIA
CN 2-8-2 3218 gallops south on the line between North Bay and Toronto, 17 miles north of Huntsville [pages 38-39]. In its amalgamation of engines from its predecessors, CN amassed 327 Mikados in the S-1 class, series 3198-3524. No. 3218, in sub-class S-1-a, was built as CGR 2818 in 1916 by Canadian Locomotive at Kingston, Ont., and not retired until 1961.

PICKERING
CN 4-6-2 5045 ambles by on the main line near Pickering, east of Toronto, with a westbound wayfreight shortly after 4-8-4 6214 thundered through with 10-car Montreal–Toronto passenger train No. 5. The Pacific, a hand-fired Baldwin built in 1912 for the Grand Trunk as 115, was one of 19 in sub-class J-3-a. It was scrapped in 1957, but three sisters—5038, 5043, and 5046—lasted in regular freight service in Michigan for U.S. subsidiary Grand Trunk Western until 1961, and sister 5030 is preserved in Jackson, Mich.

TORONTO

CPR 4-6-2 2469 is ready to leave the west end of Union Station, as are the two F units in the distance. Leet has no notes, but Canadian rail historian Jim Brown says "there's no question" 2469 is on train 721 and the F's are on 21, the *Chicago Express*, overnight from Montreal to Toronto, which will leave at 8 a.m. for Detroit with some cars Chicago-bound via New York Central. Train 721 will go at 8:05 with sleepers from Montreal for Hamilton, Ont.; from there, diesels of Toronto, Hamilton & Buffalo and NYC (co-owner with CPR of TH&B) will take through cars to Buffalo and New York City. One of CPR's newest steam engines, 2469 was built in July 1948 and cut up in 1960. A few tracks over, a streamlined CN 4-8-2 (below) is also ready to head west, probably at 8:10 on train 29 for Stratford, Ont.

CALEDONIA

CN 2-6-0 93 switches a small yard in this community, 17 miles south of Hamilton, where CN's secondary main line linking Brantford and Fort Erie crossed a branch from Hamilton to Simcoe and points on Lake Erie. The 44-year-old Mogul is among 25 members of sub-class E-10-a, all built by CLC at Kingston for the Grand Trunk (in series 1000-1024). This 2-6-0, rebuilt in '51, was one of 16 renumbered from CN 902-926 to clear the series for new GM NF-110 diesels going to Newfoundland in 1952.

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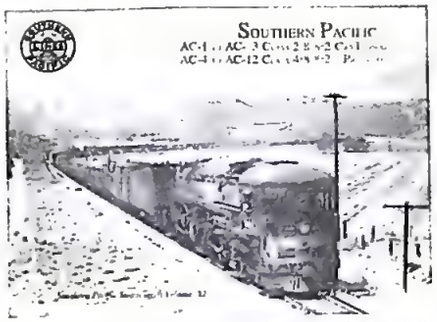

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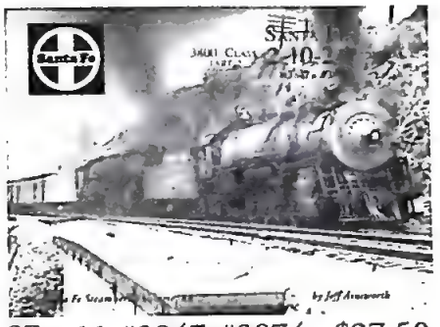

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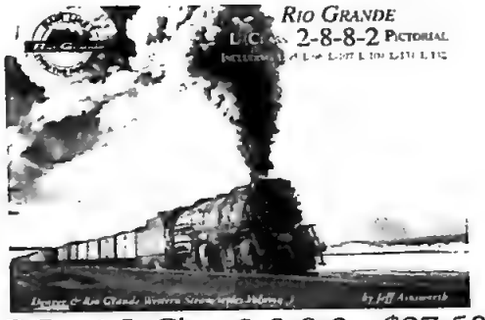

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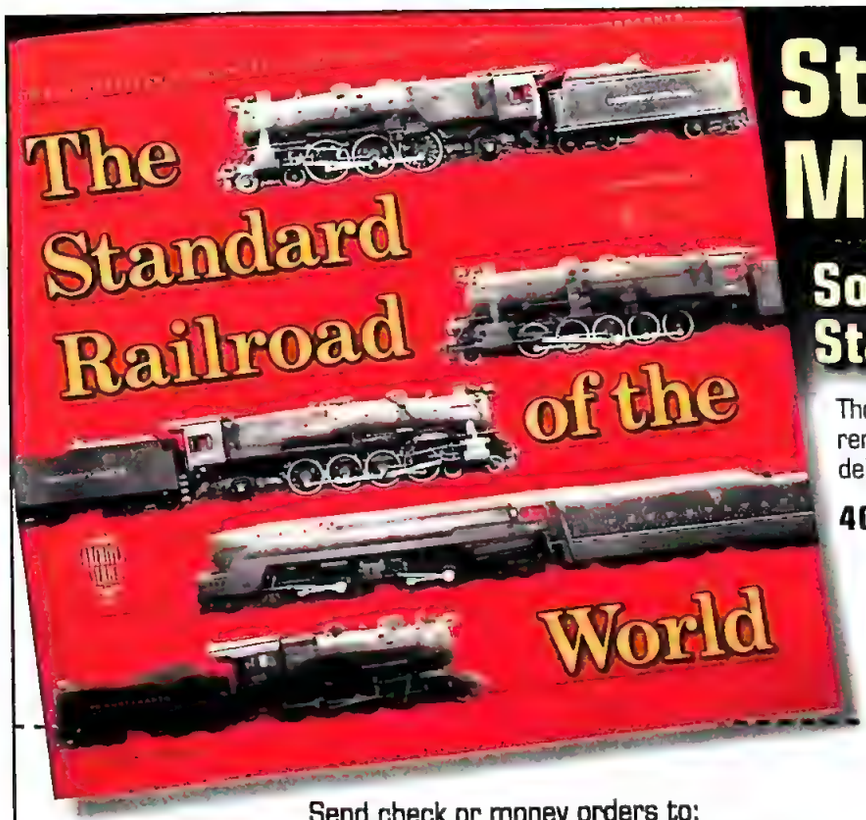

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READING SHOPS

A century of steam craftsmanship

The Reading Company's shops constructed more than 600 distinctive, dependable locomotives, including some of the most famous 4-8-4's and the very last American 4-6-2's

BY **DALE W. WOODLAND**

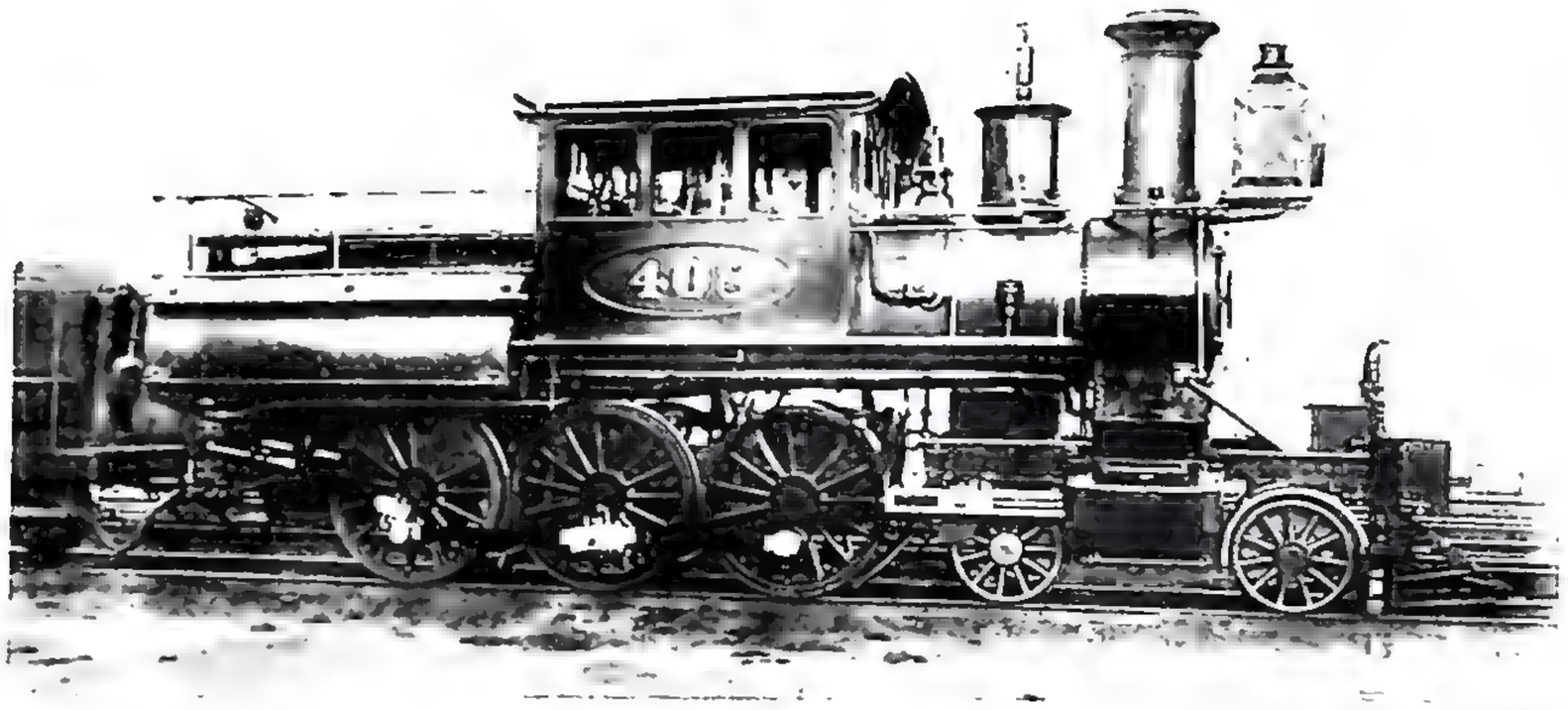
Millions of Monopoly board-game players recognize the phrase, "Take a ride on the Reading." Ride the Reading, for fun, is exactly what thousands of passengers did between 1959 and 1964 when the company operated its popular Iron Horse Rambles excursions. The steam power that made those trips possible—along with hundreds of other locomotives—was born in the railroad's shops in Reading, Pa. The Reading's rich steam-locomotive history spanned more than 100 years. In the 20th century, the shops built nearly one-third of the Reading's new steam locomotives. Reading Shops is notable for being among the last railroad-owned facilities in the U.S. to construct complete locomotives, the final orders being for a fleet of 4-8-4 Northerns and the last 4-6-2 Pacifics built for domestic service.

The Philadelphia & Reading Railroad was incorporated in 1833 to carry anthracite coal in southeastern Pennsylvania. The railroad extended from the coalfields near Port Clinton to Reading and Philadelphia. The line was opened between Reading and Philadelphia in 1839. When Port Richmond opened 2 miles up the Delaware River from central Philadelphia in 1842, the road had a large outlet for its anthracite traffic.

Expansion began in 1850 with the purchase of a segment of the Philadelphia & Columbia Railroad in Philadelphia. Over the next century, the Reading would lease, purchase, or merge with nearly 100 smaller railroads, and from the 93-mile Pottsville–Philadelphia main trunk, the road would eventually become a 1,500-mile system. In late 1923 the Philadelphia & Reading became simply the Reading Company.

The Reading's many branch lines and the relatively short haul of its bridge traffic would have an influence on the type of motive power it employed. The longest haul was Philadelphia to Newberry Junction (Williamsport), just 202 miles. The road had a great variety of operations

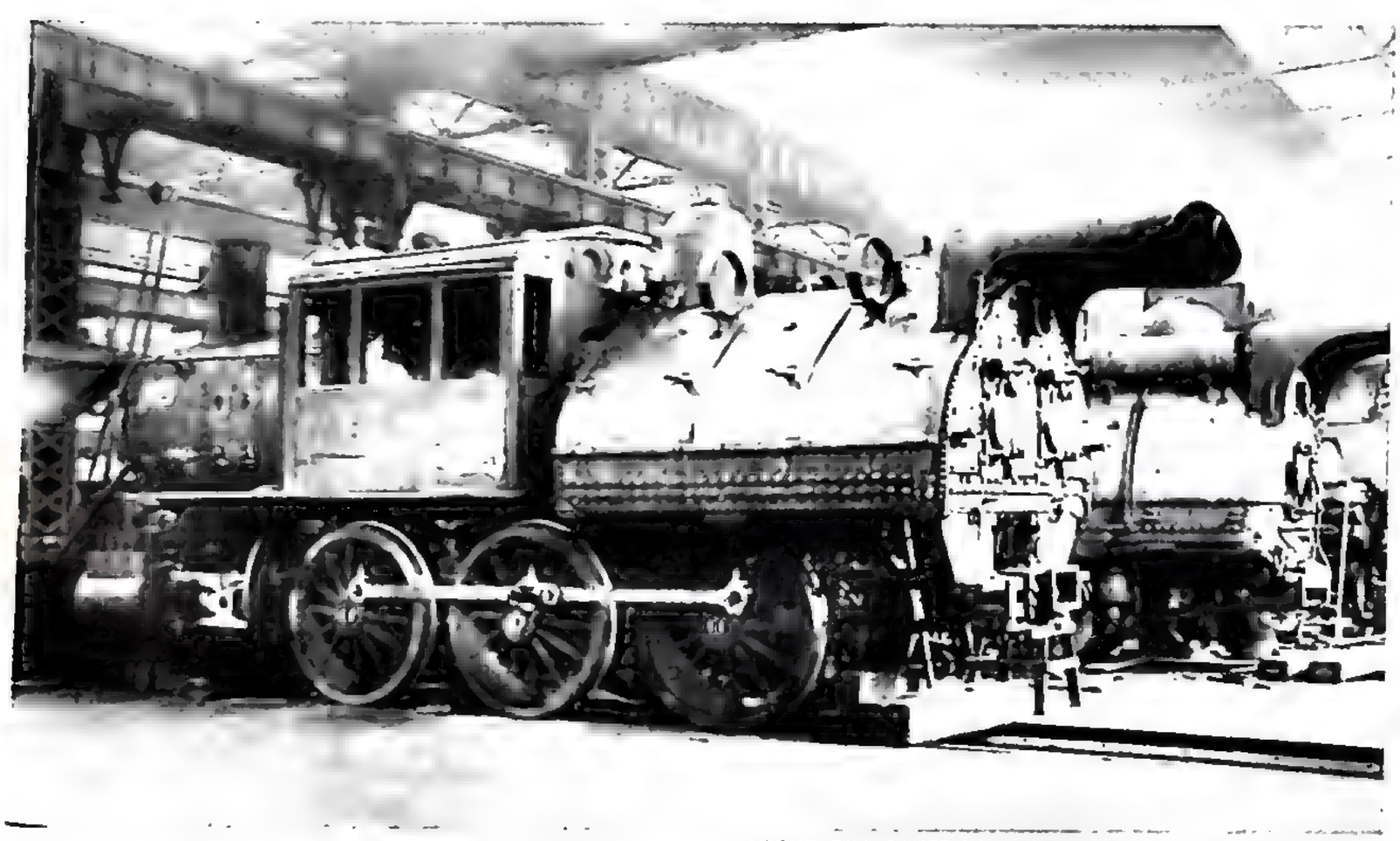
The Reading Company's main locomotive shops rise beyond several engines steaming on the pit and ready tracks at Reading, Pa. Machine shop and erecting hall are at upper right, power house at upper left.



W. A. LUCAS COLLECTION

Reading built No. 408, first engine with a Wootten firebox, in 1877; the cab, originally atop the firebox, was soon moved forward, creating the first Camelback in America.

A 1904 scene in the new shops (lower left) shows 4-6-0 No. 556 (Baldwin, 1898) undergoing conversion from a Vauclain compound to a single-expansion engine.



ABOVE, BILL CAUFF COLLECTION; BELOW, JOHN P. SCHARLE

within its compact territory. In addition to its core of anthracite traffic, the Reading operated commuter and intercity passenger trains; served farms and food processors, factories and mills, quarries and iron-ore mines; and became an important link in the Alphabet Route connecting the Northeast and Midwest.

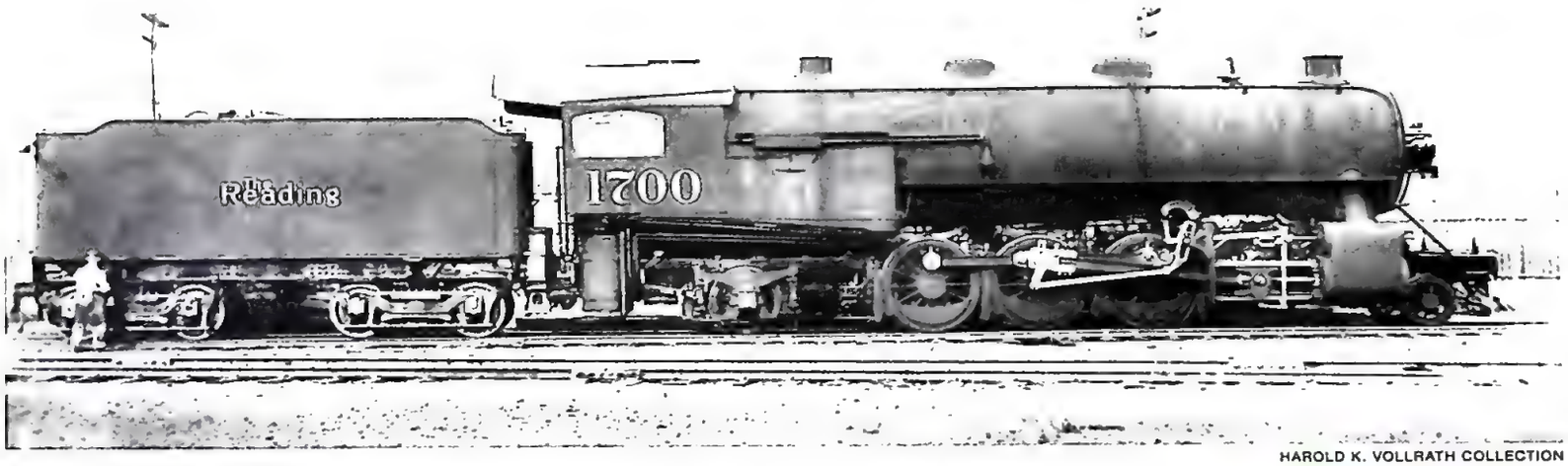
As the region's manufacturing base shrunk and traffic was lost to trucks, the Reading entered bankruptcy in 1971 and was included in the government-backed Conrail system in 1976.

A LONG LOCOMOTIVE HERITAGE

The Reading's first locomotive, a Baldwin 4-2-0 named *Neversink*, entered service in 1837. By 1843 the road was operating 37 engines and had established shops to maintain and repair them at Reading, Pa., roughly the midpoint of its main line. The shops built its first locomotive, 2-2-0 *Picayune*, in 1845.

From the beginning, the master mechanics of Reading Shops earned a national reputation for innovation. Lewis Kirk, James Millholland, and John Wootten were pioneers in the art of steam locomotive construction in the 19th century. To develop skilled labor, Kirk instituted an apprentice program to train

P-5se Atlantic 343 is from the first group of locomotives built at the new shops. Pictured at Reading in July 1938, the 22-year-old racer has 86-inch drivers.



HAROLD K. VOLLRATH COLLECTION

The first of the M-1 heavy freight hogs stands at Reading shortly after completion in September 1912. The road built prototype No. 1700, but turned to Baldwin for the 56 production versions of 1913-17.

workers. When Millholland succeeded Kirk in 1848, he introduced standardization of locomotives and emphasized the rebuilding of existing motive power. In many cases the rebuilding was so extensive that the products were, in effect, new locomotives. It was a pattern the Reading would follow to the end of steam.

Wootten succeeded Millholland and perfected the burning of anthracite coal in locomotives. Slow-burning anthracite required a very large grate area to achieve the same heat as bituminous coal, resulting in fireboxes that were roughly double the size of those on bituminous-burning locomotives. Wootten's firebox was wide and shallow, with a crown sheet curved in a large radius. The design permitted a thin fire and a light draft, which avoided blowing fuel out of the stack and enabled the Reading to use anthracite coal dust, called culm, in its locomotives, providing a considerable savings in fuel costs.

The first truly successful anthracite-burner required a firebox so wide that it extended out beyond the driving wheels to the extreme limits of the loading gauge. The enlarged firebox forced the cab to sit abnormally high on the locomotive, resulting in clearance problems. The solution was to place the cab midway astride the boiler, thus producing the distinctive Camelback configuration. Although several railroads adopted the design to varying degrees, the Reading would have more Camelbacks than any other road.

The Reading used Wootten fireboxes on most of its locomotives from 1880 until dieselization. Over time, the company shifted to a mixture of hard and soft (bituminous) coal as locomotive fuel, and in the 1940's went to soft coal exclusively. The Wootten fire-boxes were modified to burn stoker-fed bituminous coal, which proved a good fit, as larger modern locomotives required huge heating surfaces.

NEW CENTURY, NEW SHOPS

As the railroad's fleet of locomotives approached 900 at the end of the 19th century, the original shops in downtown Reading had trouble keeping up with the work, so the company began construction of a new shop complex on March 8, 1900, on an 86-acre plot of land north of downtown. Buildings included the Boiler Shop, measuring 119 x 629 feet (with a 1905 addition), which also housed the Tender Shop with a 50 x 225-foot gallery. East of this was the Blacksmith Shop, 63 x 690 feet with a lean-to and Spring Shop additions connecting to the Forge Shop in the same building. Farther east was the 132 x 404-foot Foundry building, which also included the Stock Shed, Storehouse, Flue Shop, Flue Cleaning Building, Superheater Shop, and Rolling Mill.

North of, but not attached to, the Boiler Shop was the Main Erecting Hall, with east and west bays of 144 x 750 feet. This building, ready in 1903, was at the time the largest locomotive shop in the nation. In 1905 an extension added another 60-foot bay to the width. The Erecting Hall contained 61 tracks, each big enough for a locomotive. Two 150-ton and two 225-ton overhead traveling cranes served the shop. The north end of the building housed the 192 x 404-foot Machine Shop Extension with a 55-foot-wide gallery; the traveling cranes extended into this bay. Three transfer tables and a small turntable provided locomotives access to the building.

East of the Erecting Shop was the Power House. It was expanded in 1905, 1917, and 1926 to give it 14 vertical Wickies 250 h.p. coal-fired boilers which supplied steam heat and power for all the buildings at the shop complex and the nearby Outer

Station building. Just south of the Power House was an 84 x 126-foot, two-story building which housed the Pattern Shop.

The new shops opened in 1903 and were completed in 1905. At this time, the old shops, which had constructed 405 locomotives since 1845, were closed. In 1917 the road built a 27-stall roundhouse to the north of the new shops, followed by freight- and passenger-car shops in 1926-27 to the east. The entire complex had 602,633 square feet of floor space.

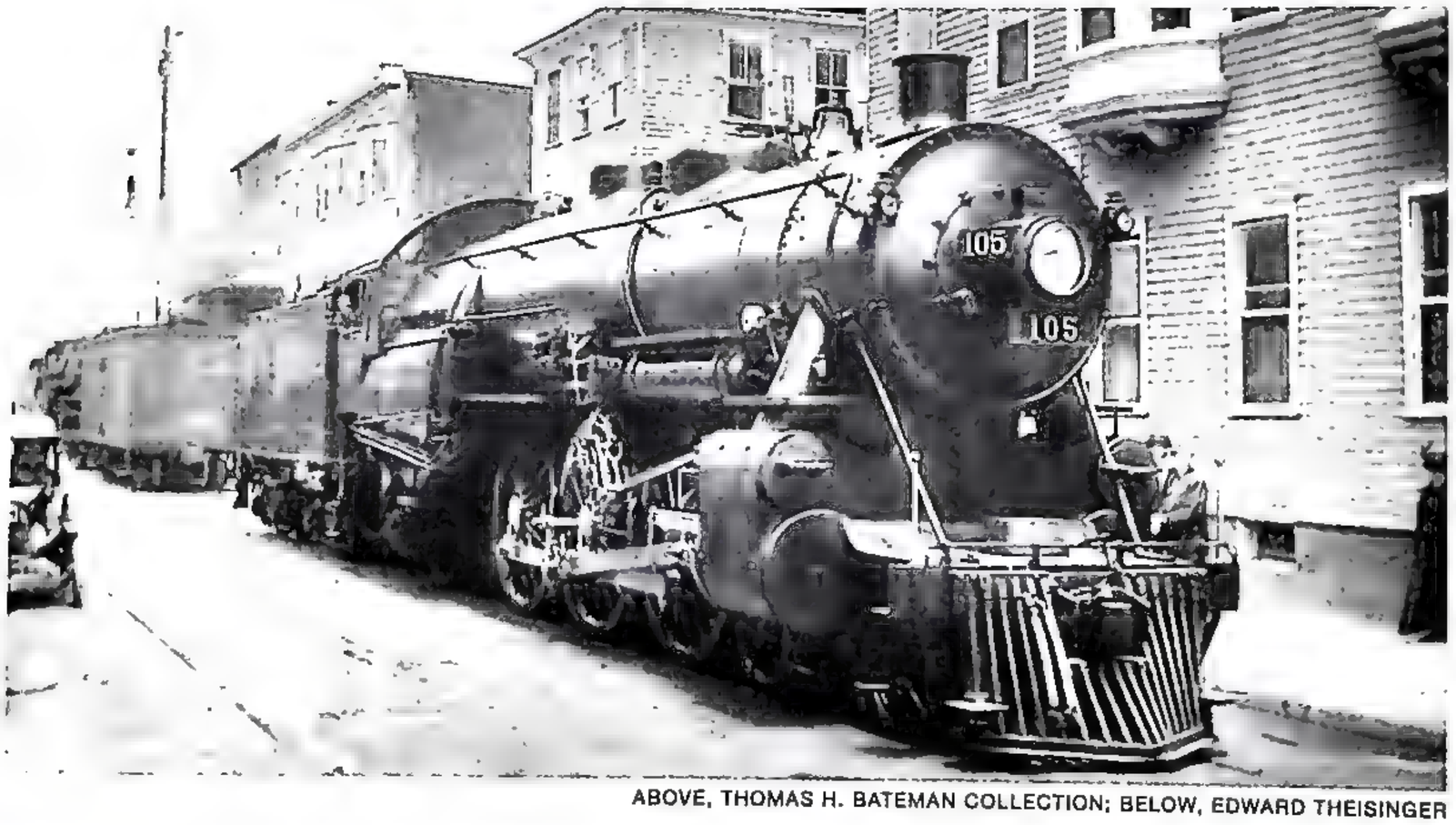
Initially the shop complex was used for rebuilding and maintaining existing locomotives, repairing up to 100 per month. Much of this early work involved replacing Vauclain compound cylinders with conventional cylinders. It was not long, however, before the first new locomotive was completed, P-5a (later, P-5se) Atlantic 340, outshopped in February 1906. Between 1906 and 1910 the shops produced 122 new locomotives, with 42 built in 1910 alone, the shops' peak year of construction. From 1903 until the end of steam, the new shops built 262 locomotives; during the same period, Baldwin, the Reading's only outside motive-power supplier, turned out 597 engines for the company. Determining how many locomotives were rebuilt at the new shops is difficult, as some were rebuilt more than once. Even in the construction of so-called new locomotives, parts often were used from existing ones. Given these facts, the number of locomotives rebuilt would total about 328.

Working for the prosperous Reading Company, shop employees were the best-paid in their crafts. Generations of workers enabled the railroad to draw on a large pool of well-qualified craftsmen. Early in the 20th century, the shops employed as many as 4,500 workers, making the facility by far the largest employer in the city. The pride felt by Reading men was reflected in their attitude of superiority with regard to rival Pennsylvania Railroad's main shops in Altoona, an attitude founded on Reading's many innovations and its head start on the PRR's facility. Indeed, Reading began building locomotives 23 years before Altoona, and finished 3 years after its cross-state rival.

In the 20th century, the shops' apprentice program was refined. Each boy served four years, divided into eight six-month periods. The work included on-the-job training under veteran journeymen as well as classroom instruction. Subjects covered included every type of position a man might take on: machinist, carman, electrician, boilermaker, pipefitter, blacksmith, painter, patternmaker, tinsmith, upholsterer, and cabinetmaker.

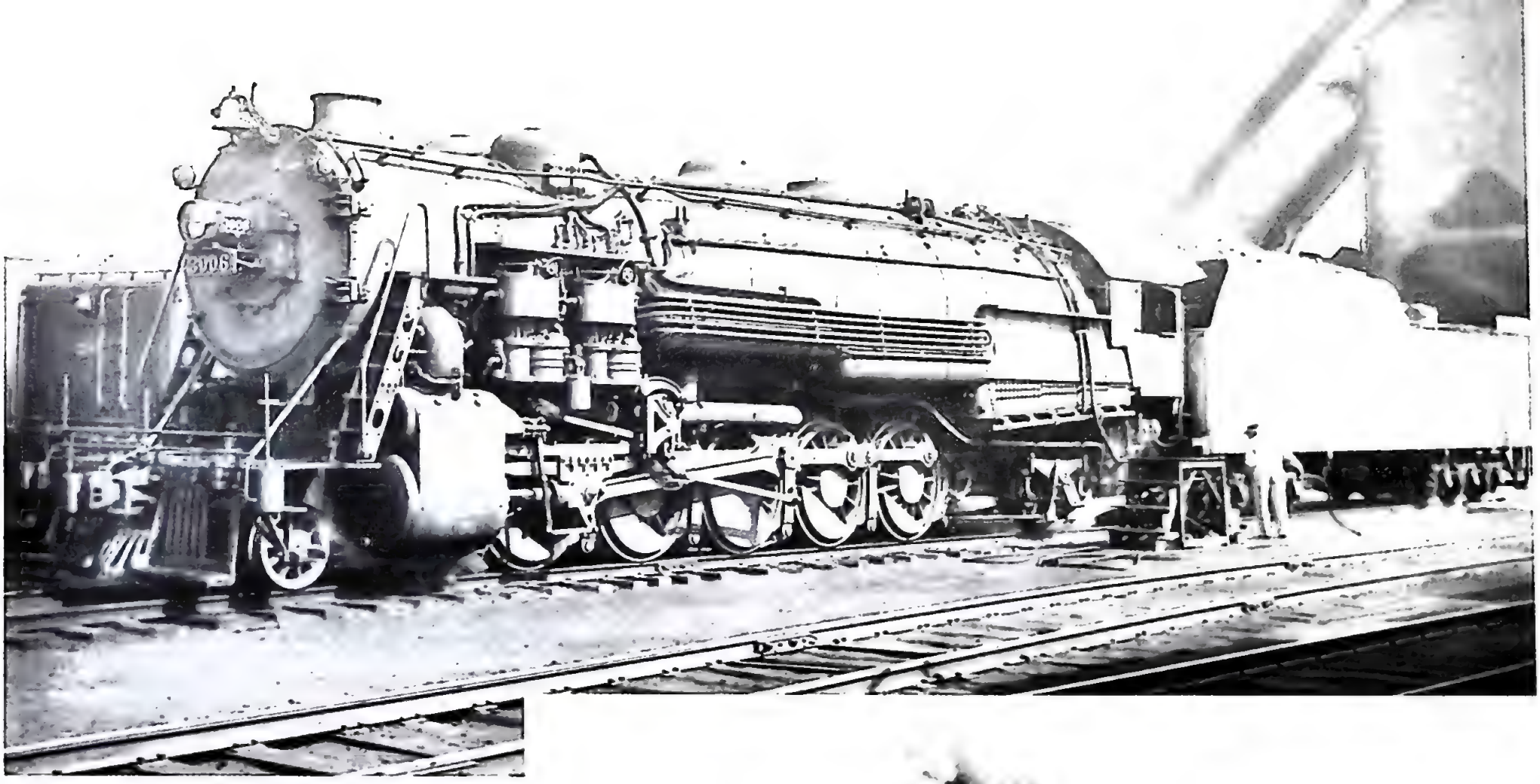
THE REAR-CAB 'READING LOOK'

Changing traffic patterns at the start of the 20th century affected the Reading's motive power. The road was moving from a dependence on the hard-coal trade to



ABOVE, THOMAS H. BATEMAN COLLECTION; BELOW, EDWARD THEISINGER

Brand-new G-1 Pacific 105, shined up for display at Atlantic City in 1916, set the pattern of RDG passenger power for three decades. Sister 125 (below, at Camden, N.J., in '51) exhibits the "Reading look"; the Belpaire firebox on the PRR Mikado in the background contrasts with 125's Wootten.



Reading Shops rebuilt 31 Baldwin 2-8-8-2 Mallets into 11 colossal K-1sa 2-10-2's like No. 3006 (above, at Reading in '38) and 20 simple 2-8-8-0's like the 1814 (right, nearing Tamaqua with a westbound in 1949).

developing bridge traffic on the east-west line between Harrisburg and Allentown, Pa. This meant a change in motive-power requirements from sheer power for hauling coal drags to locomotives capable of handling fast merchandise trains.

The need for more powerful locomotives led to increased boiler diameters, which in turn led to the return of cabs from the Camelback position to the rear of the locomotive. With the development of a new cab design in 1912, the "Reading look" was set, lasting until the construction of the very last G-3 Pacific 35 years later. Whether built by Baldwin or the road's own shops, the Reading's 20th century steam power had arched cab windows, a deeply curved roof with a tapered overhang that extended over the tender gangway, an above-center electric headlight, and a wide firebox.

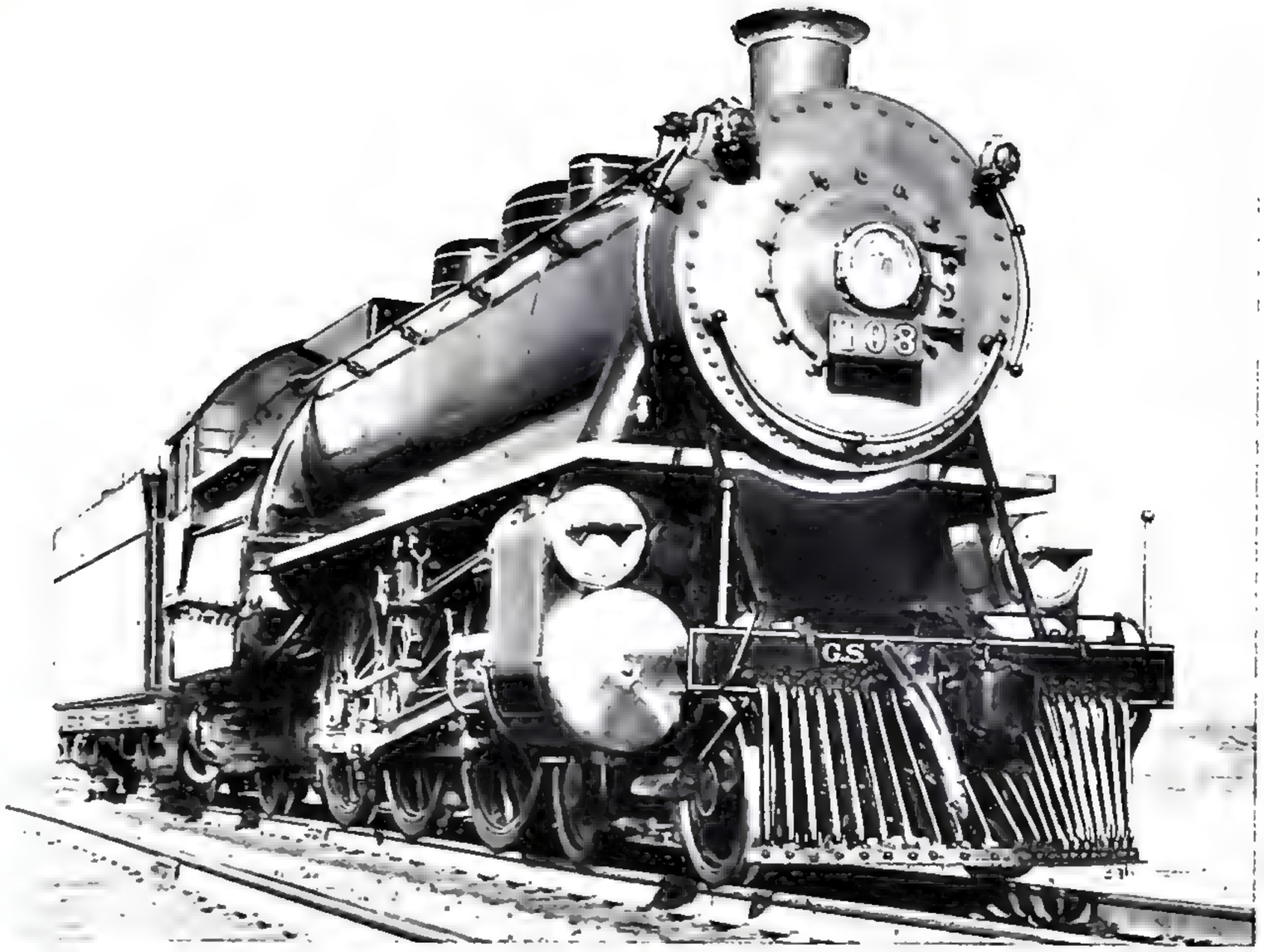
The first freight engines built with the new look (apart from a centered oil headlight) were the M-1a and M-1b Mikados. Reading built the prototype, No. 1700, in 1912; the remaining 56 came from Baldwin from 1913 through 1917. The M-1's were the Reading's first engines to have stokers, its first wide-firebox engines with rear cabs, and its first freight engines with trailing trucks. Interestingly, the railroad contemplated a four-wheel trailing truck

TOP, HAROLD K. VOLLRATH COLLECTION; ABOVE, ROBERT P. MORRIS

ABC's of locomotive repair

In April 1933, Charlies Gill, the new chief of the Reading's Motive Power & Rolling Equipment Department, introduced a new "Progressive System" of repairing locomotives. Under the Progressive System the locomotive shops were divided into six sections, designated by letters A through F, and each was identified by a color code, which appeared in huge bocks on the interior brick walls of each section. Engines would be moved successively from section to section, allowing workmen at each location to apply their specialized skills to the job in assembly-line fashion. Interestingly, a similar system had been in place during the 1850's Millholland era at the old shops in downtown Reading, but had been abandoned in the interim. The Gill-era sections were:

- Section A, Red: Stripping, unwheeling, cleaning
- Section B, White: Light boiler work
- Section C, Blue: Heavy boiler work, flue application, cylinders bored, braces fitted
- Section D, Green: Frame work and cylinders, dry pipe, steam pipe, throttle and throttle rigging, pressure fittings, boiler testing
- Section E, Brown: Jacket, cab, footboards, ashpans, smokebox, spring and valve rigging, stokers, injectors, air pump guides, pilots and couplers
- Section F, Yellow: Wheeling, pipe work, rods applied, shoes and



READING CO.

FRANK QUIN

The shops gave 18-year-old Pacific 108 (top) a British-style look in 1934; sister 178 emerged in similar guise in '36. For 1937's *Crusader* (above, speeding west at Roselle, N.J., on the Jersey Central), Nos. 117 and 118 got blue paint and stainless-steel cowling.

2-8-4 types built anywhere.

Another change in locomotive design was brought about by the introduction of all-steel passenger cars. Heavier trains required more-powerful passenger locomotives. Most varnish was handled by 4-4-2 Atlantics, which were designed to power five-car trains of wooden coaches. Reading's solution killed two birds with one stone. The road by that time had a fleet of outdated 4-6-0 Ten-Wheelers built for fast freight service, which had lost their jobs to more powerful 2-8-0 Consolidations. As a stopgap measure until more powerful passenger engines could be designed, Reading assigned the Ten-Wheelers to passenger trains on the high-speed runs.

The Pennsylvania issued a serious challenge to the Reading for the Philadelphia (Camden, N.J.)–Atlantic City service. While PRR had matched the Reading with its own 4-4-2's, it was forging ahead with the introduction of its K2 4-6-2 Pacifics. Reading's initial response was interesting: a quartet of 4-4-4's. Among these locomotives' innovative features were conical, self-cleaning ash pans on each side of the firebox, and lightweight running gear. The most unusual trait of C-1a's, interchangeable front and rear trucks, led to their undoing. The design created an unstable ride at high speed, so the locomotives were ordered off the road. Reading still needed an answer to PRR's Pacifics.

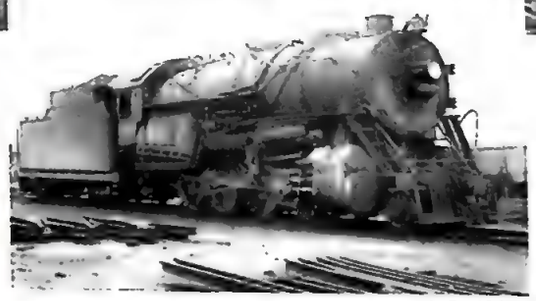
PACIFICS AND FREIGHT HOGS

In June 1916, Reading's first Pacific, G-1a class No. 105, rolled out of the com-

JOHN PICKET

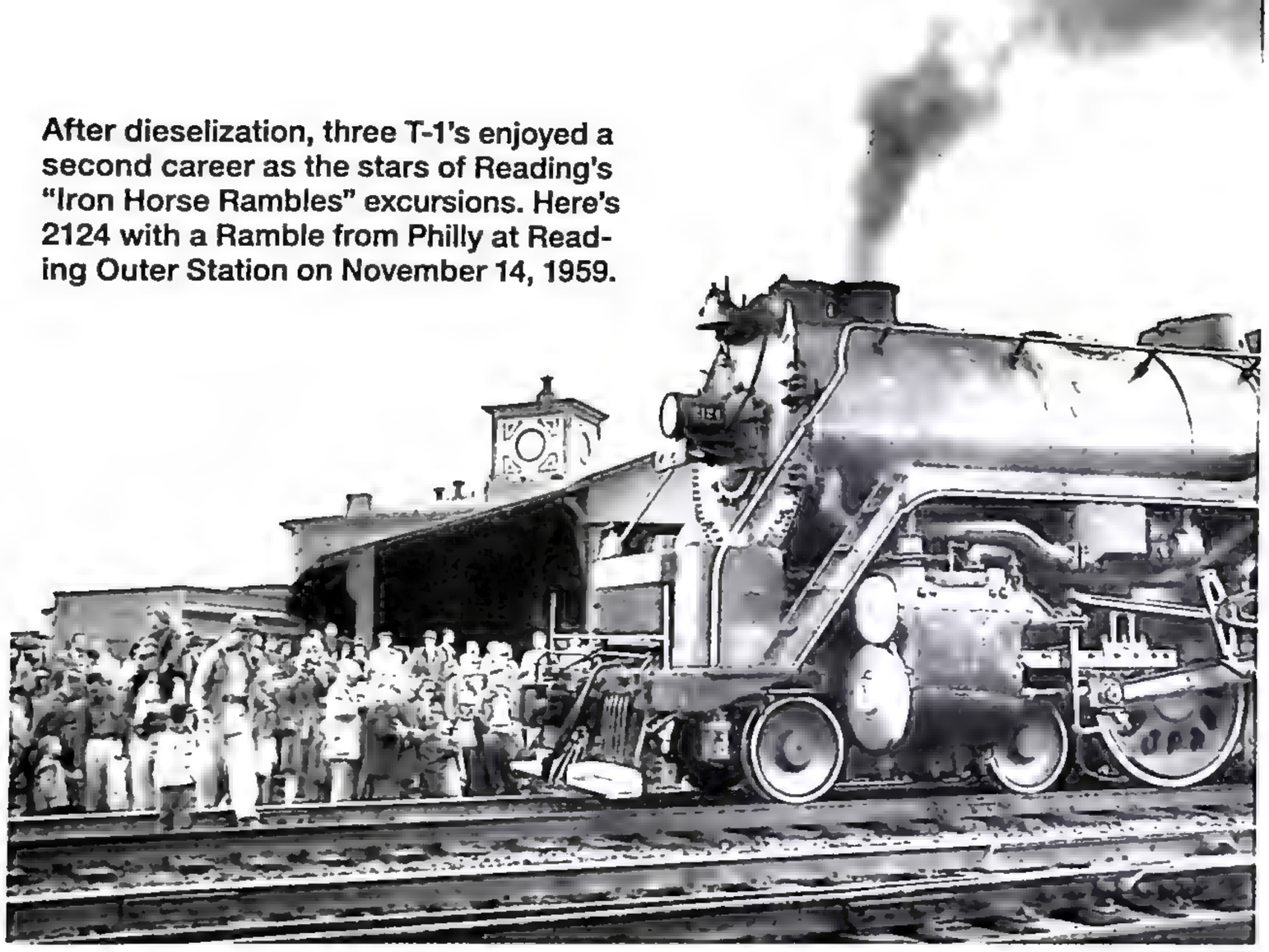
Transformation: From 2-8-0 to 4-8-4

Wheel arrangement	2-8-0	4-8-4
Class	I-10sa	T-1
Nos.	2020-2049	2100-2129
Cylinders	27 x 32 inches	27 x 32 inches
Driver diameter	61.5 inches	70 inches
Boiler pressure	220 lbs.	240 lbs.
Grate area	94.5 sq. ft.	94.5 sq. ft.
Heating surface	3,328 sq. ft.	4.920 sq. ft.
Superheating surface	1,560 sq. ft.	1,214 sq. ft.
Weight on drivers	284,190 lbs.	278,200 lbs.
Total engine weight	314,950 lbs.	441,300 lbs.
Tractive effort	71,000 lbs.	68,000 lbs.
Tractive effort, booster	none	11,100 lbs.
Tender capacity	10,000 gal., 15 tons	19,000 gal., 26 tons
Builder	Baldwin	Reading
Year(s) built	1923, 1925	1945-47



A. D. HOOKS

Reading's 50 I-10sa Consolidations (above) were among the heaviest of their type, but by the mid-1940's they were aging and too slow for modern freight work. So Reading put its shops to work converting 30 of them into T-1 Northerns. (RDG dropped the "s" for "superheating" in new engine classes effective with the T-1's.) Doing the work she was built for—rolling freight fast—No. 2108 storms east through Wernersville on the Harrisburg–Reading line.



After dieselization, three T-1's enjoyed a second career as the stars of Reading's "Iron Horse Rambles" excursions. Here's 2124 with a Ramble from Philly at Reading Outer Station on November 14, 1959.

DON WOOD

pany's shops. At 273,600 pounds, the G-1a was a substantial machine, weighing more than the road's newest I-8 class 2-8-0 freighters. The 4-6-2 had 80-inch drivers that could race 10 or 12 steel cars to Atlantic City or across the New York Division at 80 mph. The best tribute to the soundness of this design was the fact that four successive versions followed, with virtually the same specs as the original.

From 1916 through 1923, Reading built 25 G-1's, Nos. 105-129 (the later members of this group were superheated and classed G-1sa; earlier G-1a's had superheaters added and were redesignated G-1sa). Although the shops kept busy repairing and rebuilding locomotives after 1923, Pacific 129 was the last entirely new locomotive constructed at Reading until the 10 G-3's a quarter century later.

The high-wheeled G-1sa's were perfect for the New York and Atlantic City runs, but something with more pulling power was needed for the Main Line and the Bethlehem Branch. The result was the G-1sb, essentially identical to the earlier Pacifics but with 74-inch drivers; Baldwin built five, Nos. 200-204, in 1925. The same year, Baldwin also turned out five class G-2sa Pacifics, Nos. 175-179; these shared the G-1sa's 80-inch drivers but were heavier and more powerful.

During this period, the Reading's new freight power came from Baldwin. Following the M-1 Mikados of 1913-17, the Philadelphia builder turned out 31 class N-1s 2-8-8-2 Mallets for coal-region helper service during 1917-19. Next came two more classes of Consolidations: an even 100 big I-9s's and I-9sb's during 1919-24, and 50 mammoth I-10sa's in 1923 and '25.

Several roads tinkered with their 2-8-8-2 Mallets, and the Reading was no exception. Between 1927 and 1930 the shops rebuilt 11 of the Mallets into massive K-1sa class 2-10-2's. These 439,900-pound giants were followed in 1931 by 10 similar K-1sb's from Baldwin. At 451,000 pounds, the Baldwins were the heaviest, and last, 2-10-2's built in the U.S. The 21 Santa Fes were the largest freight locomotives on the Reading and also introduced to the carrier the all-welded, six-wheel-trucked, 19,000-gallon/26-ton tenders. The 20 Mallets not rebuilt to 2-10-2's were converted at Reading to simple articulateds and had their trailing trucks removed, making them 2-8-8-0's.

The shops dealt in style, not just brawn. In 1934, Pacific 108 emerged from an overhaul with a semi-streamlined look reminiscent of British motive power; No. 178 got a similar treatment in 1936. The real glamour girls were G-1sa's 117 and 118, which in 1937 got stainless-steel shrouding to match the new *Crusader* trainset for the Philadelphia–Jersey City run.

CONSOLS TO NORTHERNS

The Reading's Consolidations, Mikados, Santa Fes, and rebuilt Mallets saw the carrier through the Great Depression and the early years of World War II, but by 1944 the locomotive fleet was old, and a faster freight engine was needed. That year Superintendent of Motive Power & Rolling Equipment (and later President) E. Paul Gangewere got together with the design engineers at Baldwin to develop a plan to convert 30 of the I-10sa Consolidations into 4-8-4 Northerns. Reading Shops, which by now had been doing such major work for a century, got the job, which spanned 1945-47. The shops produced the T-1's for about $157,000 each—about two-thirds the tab for all-new engines from a commercial builder. (Also in 1944, Reading ordered its first road diesels, 10 A-B sets of EMD FT's.)

The T-1's were thoroughly modern engines, yet steeped in Reading tradition. At their heart was the I-10 boiler, whose wide firebox, designed to burn anthracite, was sufficient for a 4-8-4 on a bituminous diet. Baldwin supplied the extra boiler courses required to lengthen the boilers, as well as smokeboxes, Boxpok drivers, axles, and numerous other components. From General Steel Castings came one-piece engine beds with integrally cast cylinders, one-piece tender frames, engine and trailing trucks, and Commonwealth six-wheel tender trucks. The T-1's also got Worthington feedwater heaters, American multiple-valve throttles, and Franklin trailing-truck boosters. All 30 had roller bearings on engine, trailing, and tender trucks, while 10 had rollers on the driving axles as well. Work began in spring 1945, with the first T-1, No. 2100, being completed in September; the last, No. 2129, was outshopped in April 1947.

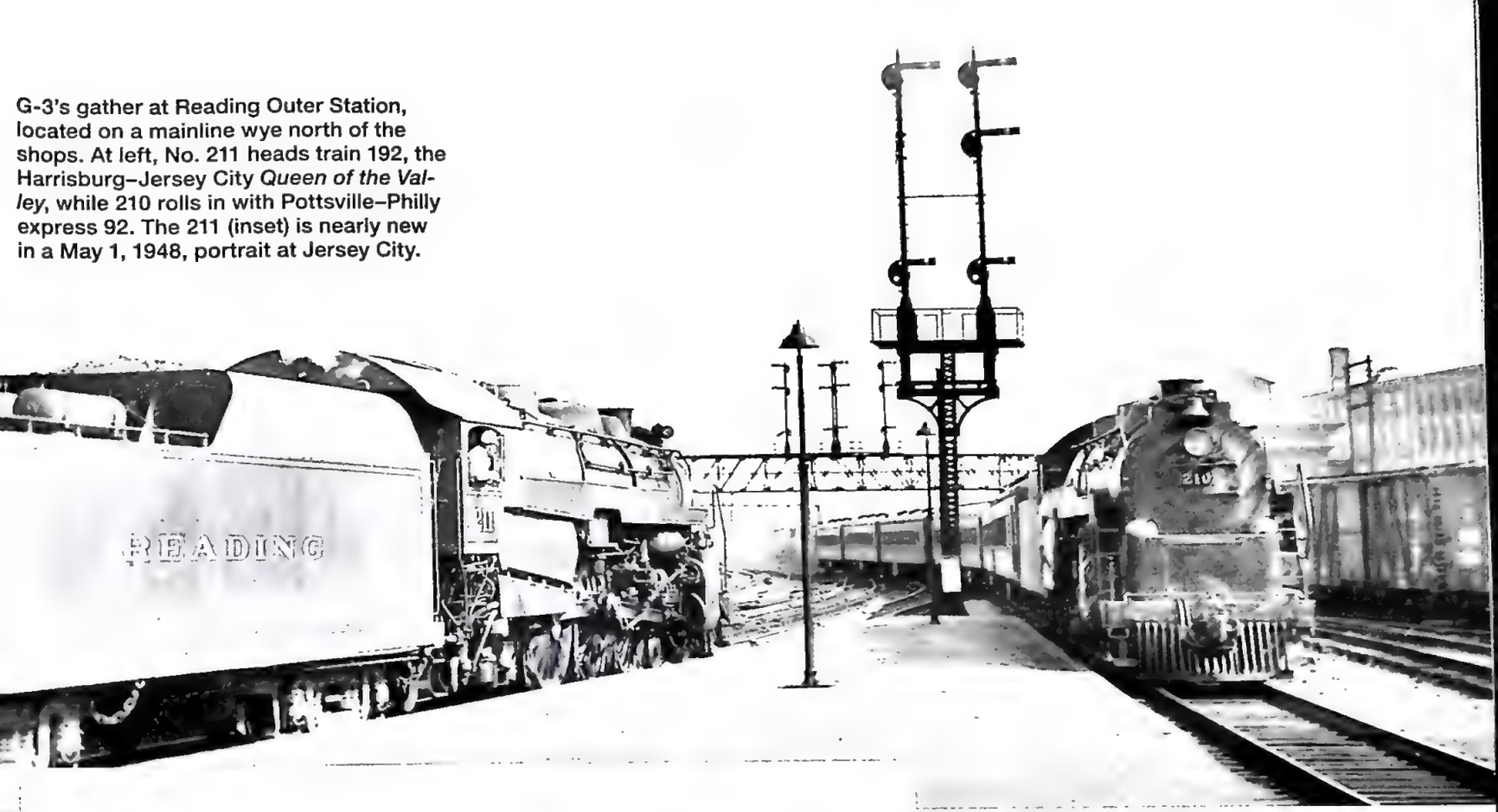
Handsome and heavy-duty, the 110-foot 6-inch Northerns were the pinnacle of Reading steam. Used in through freight service initially, they were bumped to lesser duties as diesels took over. All 30 were placed on standby in 1952, fired up only in winter to work on mine runs and as pushers. In 1956, Pennsy borrowed several T-1's and used them for a few months on its Susquehanna Division. The last regular-service use of the 4-8-4's on the Reading was in early 1957. Two and a half years later, in October 1959, the 2100's would begin a new and more celebrated career pulling trainloads of passengers on the Reading's famous Iron Horse Rambles.

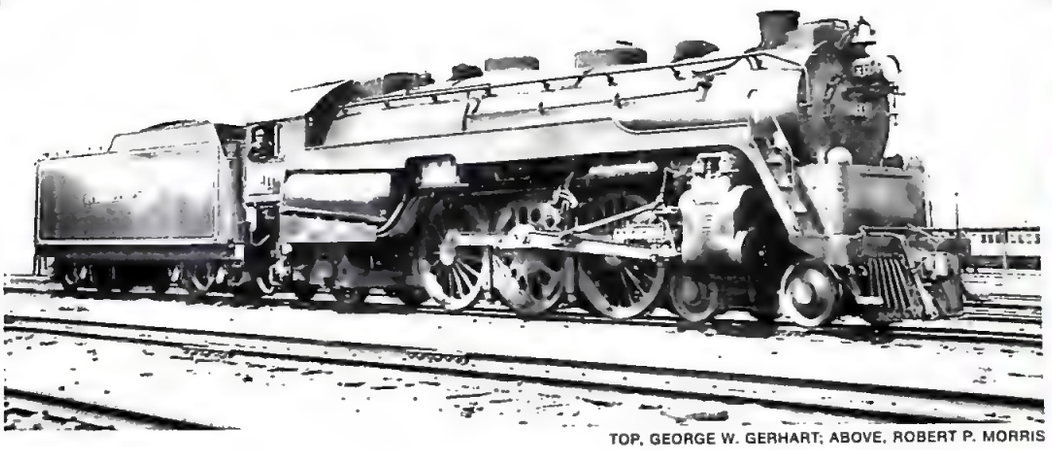
LAST OF A GREAT BREED

In 1948, Reading Shops built its final locomotives, class G-3 Pacifics 210-219. Essentially they were a later version of the G-2sa's of 1926, with improvements like higher boiler pressure (which improved tractive effort), front-end throttle, cross-counterbalanced main drivers, Worthington SA feedwater heaters, and one-piece cast engine beds. The final G-3's were outshopped in June 1948, which made them the last Pacifics built in the United States. (Canadian Pacific Railway G5 No. 1301, completed by Canadian Locomotive Co. in August '48, was the final 4-6-2 built

More on our Web site
Photos of a T-1 under construction are available at our Web site, www.classictrainsmag.com

G-3's gather at Reading Outer Station, located on a mainline wye north of the shops. At left, No. 211 heads train 192, the Harrisburg–Jersey City *Queen of the Valley*, while 210 rolls in with Pottsville–Philly express 92. The 211 (inset) is nearly new in a May 1, 1948, portrait at Jersey City.





TOP, GEORGE W. GERHART; ABOVE, ROBERT P. MORRIS

for North American service.)

The Reading's decision to build a new class of steam locomotives after the arrival of road diesels on the property is curious. Several theories have surfaced. It has been speculated that the company's close ties to the coal industry was a factor. Another thought was that the road had a long-standing faith in what steam could do in high-speed passenger service. Still others say the Reading was helping Baldwin (supplier of many G-3 components) through its difficult conversion from steam to diesel production. Finally, some say the high cost of new diesels versus homebuilt steam was the reason for the G-3's, which the shops built for $159,139 each.

Baldwin supplied the boilers, including the traditional Wootten firebox, driving wheels, and attendant rods and machinery. All wheels other than the drivers were fitted with Timken roller bearings. General Steel Castings supplied the one-piece engine beds with integral cylinders and other fittings. GSC also contributed the engine trucks, Delta-type cast-steel trailing trucks, and one-piece underframes for the tenders. In typical Reading practice, the G-3's used many components from retired locomotives, such as Alco power reverse gear, Golden Glow headlights, generators, cab-signal equipment, bells, air compressors, airbrake valves, equalizing reservoirs, distributing valves, air-pump governors, and whistles.

The first G-3, No. 210, was released from the shops on February 16, 1948. The locomotive had the classic Reading look while incorporating some of the semi-streamlining features of the T-1's: smooth

America's last Pacifics

Type	4-6-2
Class	G-3
Nos.	210-219
Cylinders	25 x 28 in.
Driver diameter	80 inches
Boiler pressure	260 lbs.
Grate area	95 sq. ft.
Heating surface	2,983 sq. ft.
Superheating surface	770 sq. ft.
Weight on drivers	197,184 lbs.
Total engine weight	329,450 lbs.
Tractive effort	48,340 lbs.
Tender capacity	13,500 gals., 17 tons (Nos. 210-214); 12,500 gals., 19 tons (Nos. 215-219)
Length, eng. and tndr.	89 ft. 2 in.
Builder	Reading
Year built	1948

Saddletank survivor

JOHN DZIOBKO

Saddletanker 1251 shuffles cars at her Reading birthplace on February 11, 1960.

Reading class B-4a 0-6-0T No. 1251 was both unique and representative of Reading steam power. Built at Reading in August 1918, the design was never repeated, leaving 1251 literally in a class by itself. In addition, the locomotive carried the words READING LOCOMOTIVE SHOPS on its flanks, not the usual READING lettering found on other company locomotives. On the other hand, engine 1251 represented the Reading's penchant for rebuilding locomotives, as it was constructed on the frame of an I-2a Consolidation utilizing the boiler (shortened), frame, drivers (minus the rear set), rods, crossheads, and cylinders.

The 0-6-0T served many years as the Reading Shops goat, and as the ranks of Reading steam locomotives diminished, its fame increased. In an ironic twist, it became well known thanks to the attention its larger cousins, the famous T-1's, brought to the Reading. Still busy every day, 1251 was one of the attractions when the Iron Horse Rambles took thousands of riders through Reading. The goat's longevity can be attributed to its size. First, it was small enough to not require a fireman, as did the diesel switchers, which filled in when the 1251 needed servicing. Second, the 28-footer fit on the small turntable used to move dead locomotives into and out of the shop.

The 1251 continued to work at the shops until February 1964, when it was retired. Although it never ventured out on the road, this late retirement date made it the last standard-gauge steam locomotive in regular use in ICC service on a Class 1 railroad. Later that year, 1251 was sold to George Hart's Rail Tours Inc. of York, Pa., where it operated in tourist-train service until October 1966. In May 1968 it was sold to the Commonwealth of Pennsylvania and moved to the Railroad Museum of Pennsylvania in Strasburg. In 1982, volunteers from the Reading Company Technical & Historical Society cosmetically restored it, and the notable switcher remains an indoor display item in the permanent collection of the state museum.—*Dale W. Woodland*

boiler jacket, running-board skirting, and shielded air pumps on the pilot deck.

The G-3's welded tenders were the largest to run behind a Reading passenger engine. With the big tenders, the G-3's could make the Philadelphia–Jersey City run without taking water, enabling the road to retire the track pans at Roelofs, Pa. However, the larger tenders necessitated the move of an 85-foot turntable from Lancaster, Pa., to replace the 75-foot table at the Green Street engine terminal in Philadelphia, where the Reading's passenger power was based. The shops built 20 of the larger tenders, 10 for the G-3's and 10 for older Pacifics. Production delays resulted in several of the G-3's going into service with older tenders until the new ones were completed.

The new Pacifics were used to inaugurate service with newly refurbished passenger consists on the *Wall Street* (Philadelphia–Jersey City) and *Schuylkill* (Philly–Pottsville) in late 1948, and the *King Coal* (Philly–Shamokin) in early 1949.

Also in the late '40's, the shops upgraded a number of older G-1 and G-2 Pacifics. Big tenders, running-board skirts, and shielded air pumps on the pilot deck made them hard to tell from G-3's at a glance.

The G-3's were good locomotives, but they were no match for the newly arriving diesels. Beginning in 1950, EMD FP7's began bumping them from top trains, and retirement came as early as 1953 for some. Others avoided the torch until 1957, thanks to assignment to the Pennsylvania-Reading Seashore Lines.

END OF AN ERA

Despite the Reading's long steam tradition, the road was for all practical purposes dieselized by 1953, and the shops were adapted to servicing the company's great variety of diesel power. Although the Reading had purchased steam locomotives only from Baldwin, it bought diesels from Alco, Baldwin, EMD, Fairbanks-Morse, and, later, GE. By 1961, with only 367 diesels in service, employment at the shops had dropped drastically.

When the Reading was included in the creation of Conrail in 1976, the shops were relegated to the maintenance of cabooses. With the elimination of cabooses from trains in the mid-1980's, the shops' final use was primarily the repair of maintenance-of-way equipment. Given the shops' proximity to Conrail's Philadelphia headquarters, "Big Blue" chose Reading to maintain its executive train. Down to just 50 employees, the shops closed on May 1, 1991, and the work was transferred to Altoona, the former PRR facility. Fittingly, on a hill overlooking the former Reading shop complex is a cemetery containing the bodies of early motive-power men Kirk, Millholland, and Wootten.

Today, although the roundhouse and coaling tower have been demolished, the erecting bay and former car shop buildings still stand. A building materials supply company uses a small portion of the erecting hall. In the 1980's, the Reading Company Technical & Historical Society made an effort to turn the shops into a museum site but was rebuffed by the city of Reading. Four T-1's, the shops' greatest creation, have been preserved. ■

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MOUNTAIN IN THE PRAIRIE STATE: Illinois Central 2612, one of 20 superb 4-8-2's crafted at the road's Paducah, Ky., shops in 1942-43, steams north on IC's main line at Peotone, Ill., on February 22, 1955. IC carried out extensive locomotive rebuilding work in the 1930's and '40's, including the conversion of 56 2-10-2's into the 2500-series 4-8-2's, but built the 2600's from scratch. Although they left the Chicago area soon after this photo, they served until the end of IC steam, in early 1960.

GEORGE KRAMBLES, KRAMBLES-PETERSON ARCHIVE

F. E. BUTTS, KRAMBLES-PETERSON ARCHIVE

STEAM IN THE STREET: Among the best-known Midwestern locales for Class 1 mainline street-running was Fifth Street in Monon's shop town of Lafayette, Ind. On March 14, 1940, Pacific 444 is about a block and a half out of Monon's 1902 Indiana Limestone depot (after its 1959 closure, a civic theater) as it nears the streetcar tracks in Main Street with Chicago-Louisville train 5. Monon dropped varnish in 1967, and successor CSX relocated its track away from Fifth Street in 1994.

Before sunrise, waitress Ema Lou Gadd serves up coffee and breakfast to engineer Herbel and fireman Myron Pease in the NKP depot restaurant at Bellevue.

A day with ENGINEER

A veteran Nickel Plate hogger shows how it was done at the end of steam

PHOTOS BY **ART HANFORD**

By spring 1958, steam locomotives were gone from most railroads. The few roads that hadn't yet gone all-diesel were heading there fast. An era was passing for America, and especially for the members of the Brotherhood of Locomotive Engineers. To mark this profound change, the union's publication, *The Locomotive Engineer*, sent photographer Art Hanford out to document a typical run on a steam locomotive.

Headquartered in Cleveland, the BLE didn't have to look far to find engineers working as the breed had done for generations: handling powerful, fast locomotives on important trains. The Nickel Plate Road, which had bought new steam power as recently as 1949, was still rolling its magnificent Berkshires through town at the head of fast and local freights on its Buffalo–Chicago main line—but diesels were coming on fast. Early one morning, Hanford joined veteran engineer Walter L. Herbel at Bellevue, Ohio, for a run on CC-2, a freight to Conneaut that did pick-up and set-out work at Cleveland.

The Locomotive Engineer published Hanford's photos under the headline "Steam Still Doing a Job" in its May 23, 1958, issue. The title was not accurate for long: the last regular NKP 2-8-4 run was on July 2. Herbel, who became an engineer in 1918, died in 1968.

Having inspected his locomotive, Herbel strikes a pose with his pocket watch before proceeding to the yard office, where he'll get his orders and sign out for the engine.

Herbel gets into his heavy denim work clothes in the Bellevue locker room before heading out to his engine. His grip, containing supplies needed for a day on the road, sits open on a table before him.

In the Bellevue yard office, Herbel checks his watch against a standard clock, as required by railroad rulebooks nationwide. His train, designated CC-2 and running as Extra 814 East, will operate on Eastern Time.

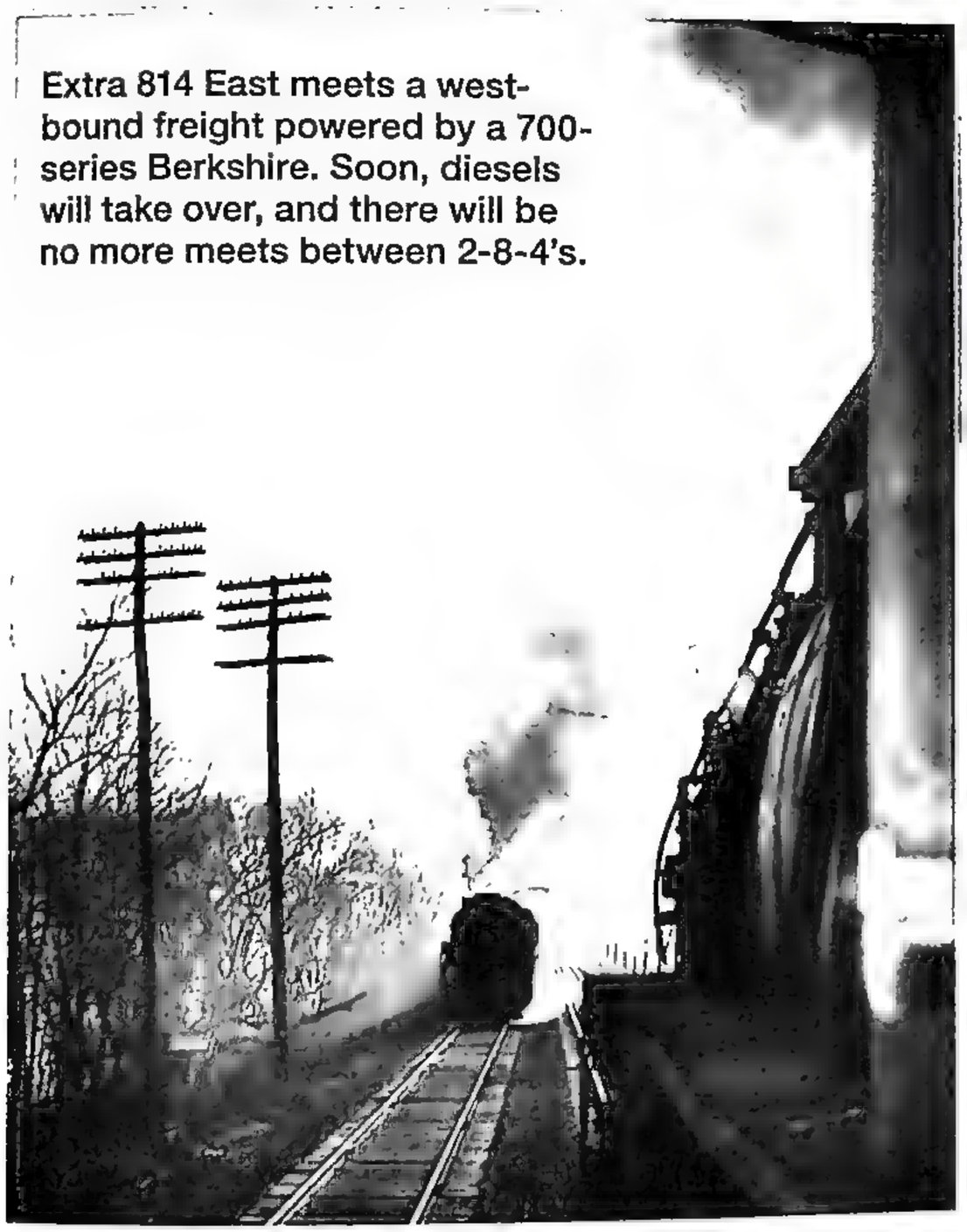
Herbel signs out for engine 814, one of 32 Wheeling & Lake Erie 2-8-4's NKP acquired when it leased the Wheeling in December 1949. W&LE 6401-6432 became NKP 801-832.

Herbel oils the rods during his inspection of the 814, a giant compared with the ones in service when he went railroading in 1915.

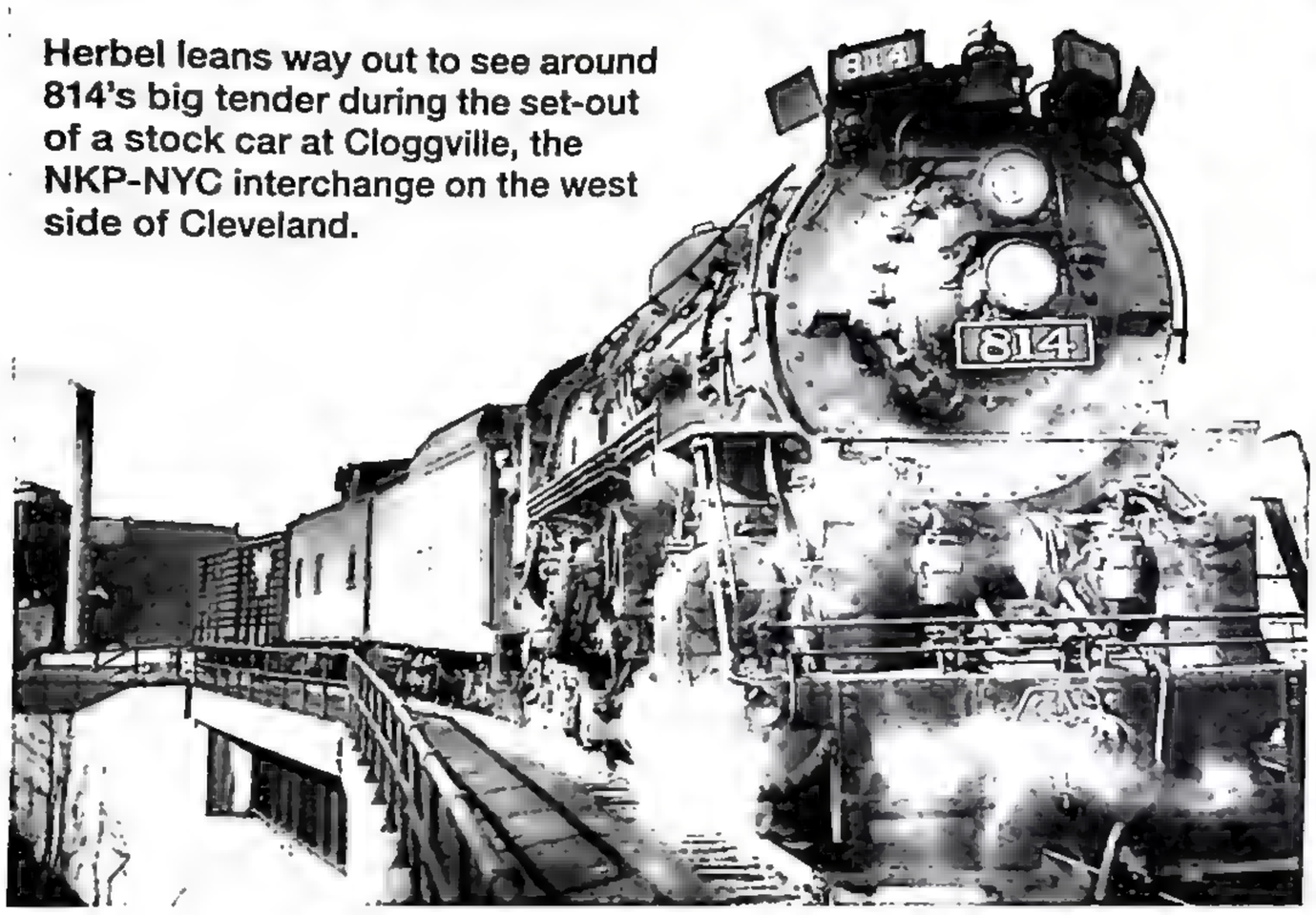
As dawn breaks at the Bellevue coal dock, No. 814 has extra flags in place and white classification lights lit for the run east. The former W&LE Berks tended to stay on home rails until 1957, when NKP moved six to the Cleveland Division, where they were considered superior to the 700's for local work.

Homemade cigarette dangling from his lips, Herbel is silhouetted against the morning sky as he makes 50 mph down the main line on the 814 with Conneaut-bound CC-2.

Extra 814 East meets a west-bound freight powered by a 700-series Berkshire. Soon, diesels will take over, and there will be no more meets between 2-8-4's.



This would be Herbel's view to the rear on a curve. Clouds of steam hanging over CC-2's 43 loads and 6 empties in the morning air during the



Herbel leans way out to see around 814's big tender during the set-out of a stock car at Cloggville, the NKP-NYC interchange on the west side of Cleveland.

Its work at Cloggville done, CC-2 continues east through Cleveland. Herbel's view ahead here is of NKP's lift bridge over the Cuyahoga River, installed the previous year to replace an old bascule span.

At the 75th Street coal-and-water station on Cleveland's east side, fireman Pease pulls a water-column spout over the tender to top off the tank. Behind the camera is the big concrete coal dock, from which Pease replenished the 814's fuel supply.

During the water stop at 75th Street, photographer Art Hanford takes a turn in front of the camera for a picture with Herbel.

GATHERING AT THE MOUNT: One might call this scene "Monsters of Missoula," but the Northern Pacific locomotives at that Montana terminal on January 20, 1946, are dwarfed by snow-covered Mt. Jumbo. Present are (from left) one of eight A-3 class 1938 Baldwin 4-8-4's in the 2660 series; Z-8 Schenectady 4-6-6-4 Challenger 5138, one of 20 built 1943-44, and W class 2-8-2 1592, among 160 from Brooks 1904-07. NP got the first 4-8-4's, in 1926, hence the name "Northern" type.

BARNEY L. STONE, KRAMBLES-PETERSON ARCHIVE

MODERNIZED MOUNTAIN: With just a trace of smoke to mark her effort, Rock Island 4-8-2 No. 4060 pulls away from Englewood, 6 miles from the end of her run at La Salle Street Station, Chicago, in the mid-1940's. Alco built her in 1929 as the next-to-last of RI's 62 passenger-hauling M-50's. Between 1939 and '42, the road modernized the final 18 with roller bearings on all axles (a favorite RI improvement), lightweight main and side rods, Boxpok main drivers, new pilots, and big tenders.

CHALLENGERS

Cheyenne, Wyo., July 11, 1959: Waiting for UP Challenger 3703 (right, at far left edge of photo) to leave, we were surprised by the westbound *City of Los Angeles* as it slipped into town. Soon we were following the 4-6-6-4 out beyond Archer (above).

east

Why I never saw a Big Boy move under steam

BY **J. DAVID INGLES** • PHOTOS BY THE AUTHOR

Mainline steam was on its last legs when I achieved automobile mobility, so I was privileged as a teen and young adult to add a few memories to my childhood ones of Illinois Central 4-8-2's leaving town from Chicago's far-south suburbs. In the late 1950's, I saw small amounts of everyday steam to varying degrees on a handful of roads. Norfolk & Western was too far away from my Detroit-area home, but B&O and Nickel Plate were not, and, in Michigan, Grand Trunk Western offered the main course. Riding and/or chasing long-distance, high-speed steam excursions on Burlington Route, Canadian National, Colorado & Southern, and Missabe Road added to my memory bank, as did workaday steam on the Rio Grande narrow-gauge.

Oh yes, there was another Class 1 whose steam I saw, if only for a precious couple of days—Union Pacific, in its steam finale.

The time was July 1959, and our family was on our fourth annual Colorado vacation. It was extended when my sister became slightly ill, a delay that required Dad to go back home to work for a week while the rest of us stayed in Denver until she recuperated. I was without wheels of my own, so when a special rail excursion surfaced, I had to beg a ride with local Rocky Mountain Railroad Club friends, some of whom were transplanted Chicagoans my parents had known for years.

The excursion that drew the Denver crowd north wasn't on the UP. On tap for Sunday, July 12, it was a private charter on the Colorado & Southern out of Cheyenne, set up by UP employee Jim Ehernberger for artist Howard Fogg and a group of "Rocky Club" stalwarts. It was to be pulled by C&S 2-10-2 900 north to Wendover and Guernsey, Wyo., and back. The consist was short: 900, silver heavyweight coach 551, and waycar (caboose) 10562 (all C&S). With Dad back in Michigan, it was agreed that I could tag along with our mutual friends. A great day on the north end of

My best live Big Boy photos are of 4017 and 4014 (off to the right, pointed west) at the coal dock—but they weren't moving.

the C&S was had by all—there were almost as many stops for photos as there were passengers (27).

But the prelude was even better. Since the 900 charter was to run on Sunday, the day before was available for train-chasing, a decision that had become a slam-dunk, since Union Pacific had just returned steam to everyday service out of Cheyenne.

It is said that "timing is everything." UP's resuscitation of steam in July 1959 was brief, but it matched my window of opportunity, which also was brief. UP had put Big Boys as well as Challengers back in service out of the Wyoming capital, and I would see both types under steam, but only the 4-6-6-4's in action. Blame the Big Boys' enduring popularity, and direction of travel.

According to "The Last Days of Class 1 Steam," Kansas historian Lloyd Stagner's authoritative account in the Volume 47, No. 6 edition of the NRHS's *National Railway Bulletin* of 1982 (and later presented in book form), UP steam had been a seasonal, on-and-off operation since the conclusion of the peak perishables rush in September 1957.

"Steam-operated through freight service east of Cheyenne was discontinued by September 22, 1957," wrote Stagner. "Beet runs [in Colorado and Nebraska] were dieselized by October 25. The Ogden helpers —11 3700-class oil-burning 4-6-6-4's protecting all eastbound Ogden–Wahsatch jobs—were stored at the end of October, and only a handful of 4000's worked into early November." Following occasional steam runs through January 2, 1958, "no more Union Pacific steam operated until a railfan excursion on June 6."

Later in 1958, a heavy perishable rush and more diesels than usual in the shop brought back steam from August through October, "although five [4-8-4] 800's

Following the 3703 East was 3710 East, smoking it up for our cameras as it departed Cheyenne yard for North Platte. Again we'd tag along out past Archer.

remained active east of North Platte throughout November, and the 3700's continued to run out of Ogden into December," Stagner reported.

"In spring 1959, two 4000's received classified repairs at Cheyenne, and during June the seven 3700's at Ogden worked east to Cheyenne." Those seven Challengers, plus an eighth, 3707, "entered service in the North Platte–Cheyenne freight pool on July 3, 1959," according to Stagner, "and six 4000's were returned to Cheyenne–Laramie freight work on July 6."

It was these Challengers that I would chase. One reason this group, 3700-3717, survived so late was that they were oil-burners. They were originally coal-fired, but in 1946, 10 of them, 3975-3984, were

My only encounter with a live Big Boy on a train involved the 4019 East, waiting out west of Tower A to enter Cheyenne yard.

Our best chase of the day was of UP 3708 West, heading into the afternoon sun. We picked it up east of Egbert, 35 miles from Cheyenne, and stayed with it to Archer.

East of Hillsdale, a way station 12 miles west of Egbert and 20 miles out of Cheyenne, we recorded a fine coming-and-going sequence of 3708 on a curve. Note the Georgia Railroad boxcar fourth back.

One of our finest shots of 3708's North Platte–Cheyenne extra was as it stormed by the station at Hillsdale, a speck on the maps of the UP and the Lincoln Highway.

converted to oil and reassigned to the Pacific Northwest for fast freight and passenger service. In 1952, eight more were converted, and all were renumbered into the 3700 series.

Saturday, July 11, 1959, dawned sunny as I and two other "Rocky Club" regulars from Denver drove up to Cheyenne. One was a longtime family friend and a contemporary of Dad's, the late Dan K. Peterson; the other was Dave Gross, only two years my senior. We were in Dave's car, a two-tone green 1958 Chevy.

Upon arrival in Cheyenne, we first went to the UP roundhouse to see what was up. Two Big Boys were under steam at the huge coal dock: 4017 in off an eastbound, and 4014 ready to go west. Turns out my photos there were the best I'd ever take of a live Big Boy. The Denver guys, the lucky dogs, had had their fill of Big Boys on Sherman Hill and environs between Cheyenne and Laramie. For them, the oil-burning Challengers shuttling between Cheyenne and North Plate were unusual, so that's what we went after.

First, the 3703 went east. As it was preparing to depart, the *City of Los Angeles*, with a Milwaukee Road full-length Super Dome on the rear, quietly dropped into town from the east, surprising those of us who were camped on the road overpass at the UP yard's east throat, eyeballing the Challenger. We followed the 3703's train for a couple of shots, the final one just beyond Archer, the first siding east, on top of the grade out of town.

Behind him was another eastbound freight, led by the 3710, which we also followed for a short time before heading back to the roundhouse. Big Boy 4014 was still at the coal dock, more visible than before since the 4017 had been put inside the house. If I recall correctly, we went after an eastbound coming off Sherman Hill, but he beat us to the punch. We found him —Extra 4019 East—at the west end of town, beyond Tower A and the C&S overpass, waiting to enter the yard. This would be my only sighting, and photo, of a live Big Boy on a train . . . but it wasn't moving.

The highlight of the day was still to come, however. We'd gotten word of a

A VW bug full of chasers has pulled up behind Dave Gross's Chevy as 3708 stops to enter Archer siding, for which the head brakeman throws the switch. We're looking down at the original Lincoln Highway-UP crossing from the successor road bridge.

westbound Challenger-powered freight out of North Platte, so instead of waiting to see the Big Boy move into the yard, we headed east, intercepting the Extra 3708 West three miles east of Egbert, about 35 miles out of Cheyenne.

We followed this train, getting some fine action photos, as far as Archer, where he took siding to let the 320 West, powered by three new GP9's, overtake him. As the 3708 pulled out of the siding, I exposed my last frame on the roll of Kodachrome as an eastbound "fruit block" of Pacific Fruit Express refrigerated boxcars roared by behind an A-B-B-B-A set of F7's. This concluded our chase.

After the glorious next day on Ehernberger's C&S charter, I was back in Denver late that Sunday evening . . . but I was not quite through with UP steam. Dad returned from Michigan during the week, and the following Saturday, July 18, we made a quick trip up to Cheyenne so he could catch some action. We made a short chase of a westbound, powered by the 3715, into Cheyenne, beginning at Durham, Wyo., east of Archer, but in contrast to the Saturday before, the skies east of Cheyenne were very overcast . . . not good for ASA 10 Kodachrome! Dad shot the slides, and I went back to my customary 35mm black-and-white (many of us "got off on the wrong track" in our beginning photography, didn't we?). We also got some dark shots of the 3710 East around Archer.

Another C&S steam excursion was on tap the next day, though, so the 3710 would be my final look at UP revenue-service steam freights. This special was a public

After the 4-6-6-4 entered Archer siding, we moved to the then-current Lincoln Highway bridge and shot UP 320 West with new GP9's roaring by. As 3708 began to re-enter the main, a "fruit block" with F's went east.

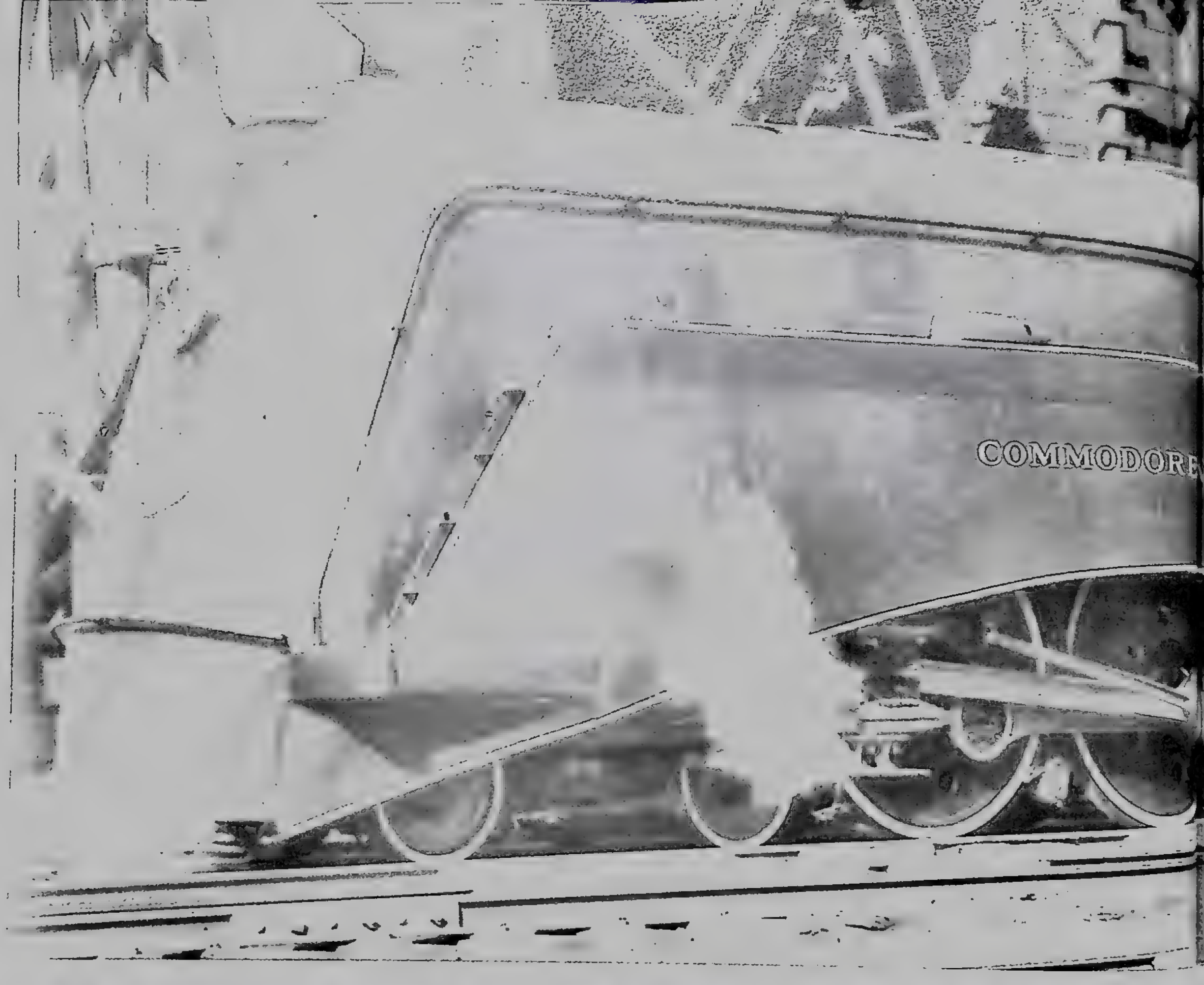
fan trip by the Rocky Club, featuring 2-8-0 647 north from Denver to Cheyenne, with a side trip backing up the Owl Canyon branch out of Fort Collins. The excursion returned from Cheyenne behind the 900, which the next day—Monday, July 20, 1959—hauled a work extra of maintenance-of-way cars from Denver back to Cheyenne.

Dad and I chased it from Prospect Junction in Denver north through Boulder and Louisville, as far as the street-running in Longmont. This was the 900's final run, and one of the last by any 2-10-2 in the U.S.—only a handful of Illinois Central 2-10-2's outlasted it, although a Missabe Road 2-10-2 would claim "last" honors with a September 29, 1962, fan trip.

Owing to a nationwide steel strike and the correlated drop in rail traffic, UP steam would not last out the week, and then be forever silent (except, of course, for excursions with 4-8-4 844 and later, Challenger 3985). Jim Ehernberger says he and Lou Schmitz of Omaha shot Big Boy 4019 on its last trip west, to Laramie, on July 19, as well as an eastbound train with 3715 and 3722 doubleheading. Stagner reports that the last Big Boy to run was the 4015 East on July 21. Two days later, on Thursday, July 23, UP ran its final regular-service steam-powered freight, when Challenger 3713 West out of North Platte tied up in Cheyenne.

Thanks to availability and luck, I got to witness everyday UP steam in its final days. Timing, indeed, is everything. ■

Riders on Jim Ehernberger's Cheyenne–Guernsey C&S 900 charter cling to their spots (above) as one of the dozens of photo runbys is executed on the CB&Q east of Wendover. The next Saturday, C&S 2-8-0 647 (left) backed up the Owl Canyon branch west of Fort Collins. Monday, July 20, saw 900's final run—a Denver–Cheyenne work extra, viewed from the Denver–Boulder Turnpike along Church's Lake (below).



STREAMLINING

Drawings and models show the evolution of two landmark 4-6-4 designs

BY **RICHARD L. STOVING**

To even the most casual observer, few American steam locomotive profiles can be as familiar as the two which identified New York Central's streamlined Hudson-type passenger locomotives. The one-of-a-kind J-1e named *Commodore Vanderbilt*, outshopped in 1934 as the first streamlined steam locomotive in America, created such a stir that hundreds of thousands of toy replicas carried her lines to homes far removed from the Central's tracks. And the 10 J-3a's of 1938, styled for the *20th Century Limited*, went on to become a symbol of the railroad they served.

Seven decades after they first appeared, these locomotive designs are so familiar that it is unnecessary to review them here. But it might be interesting to consider the preliminary designs which led to the finished, familiar locomotives. To the best of my knowledge, these designs have never before appeared in print.

A bachelor with spare time on his hands early in 1934, Carl F. Kantola, assistant engineer in Central's Equipment Engineering Department, drew a pencil sketch, dated February 24, 1934, of a streamline design for a J-1d Hudson [top drawing, page 81]. A modified version of

The most fully streamlined locomotive in America, the *Commodore Vanderbilt* poses in Cleveland in 1935. Note that the Hudson displays no road

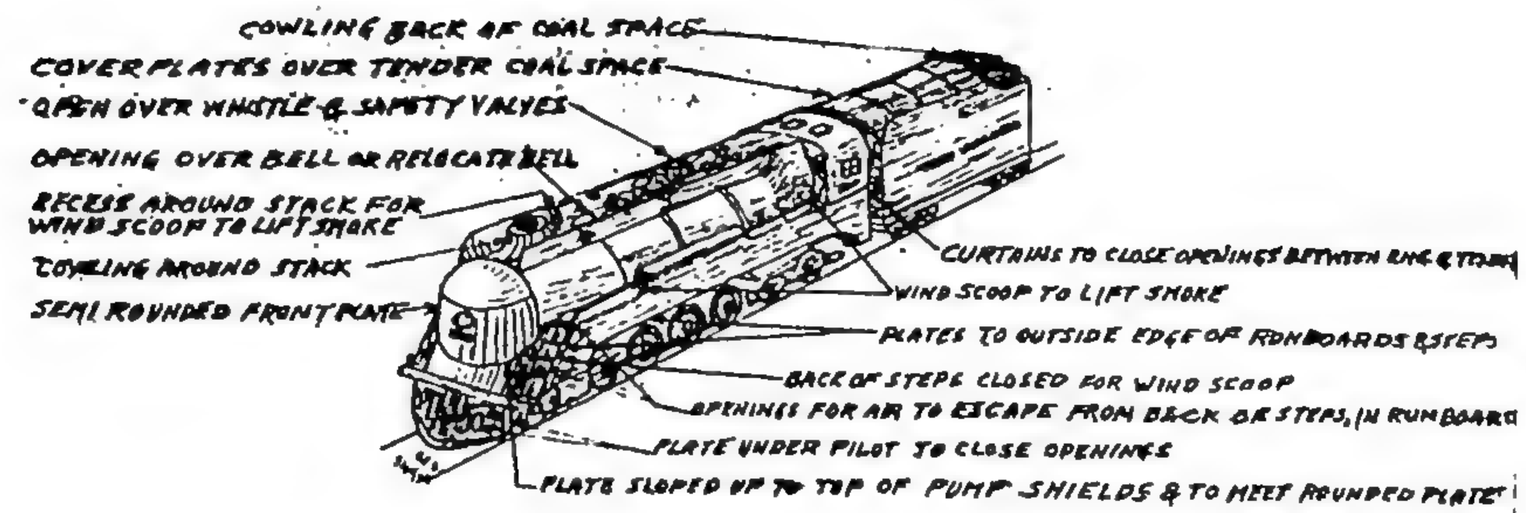
GLENN GRABILL JR.

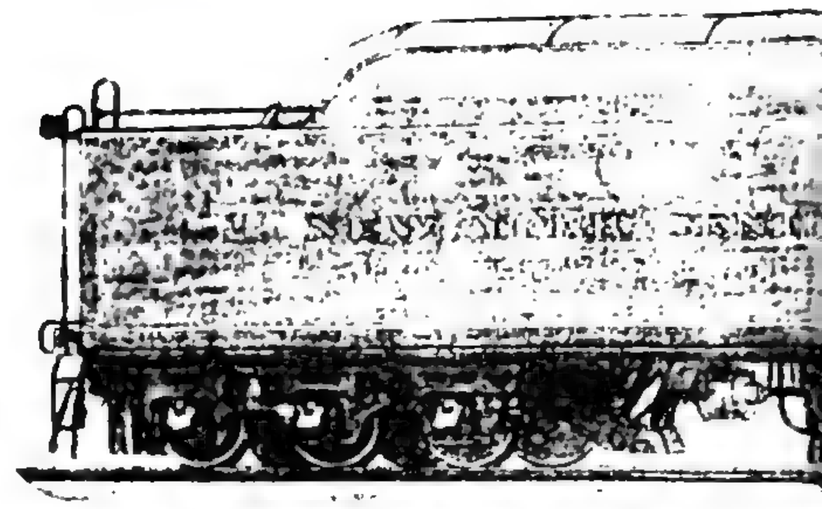
THE CENTRAL'S *thoroughbreds*

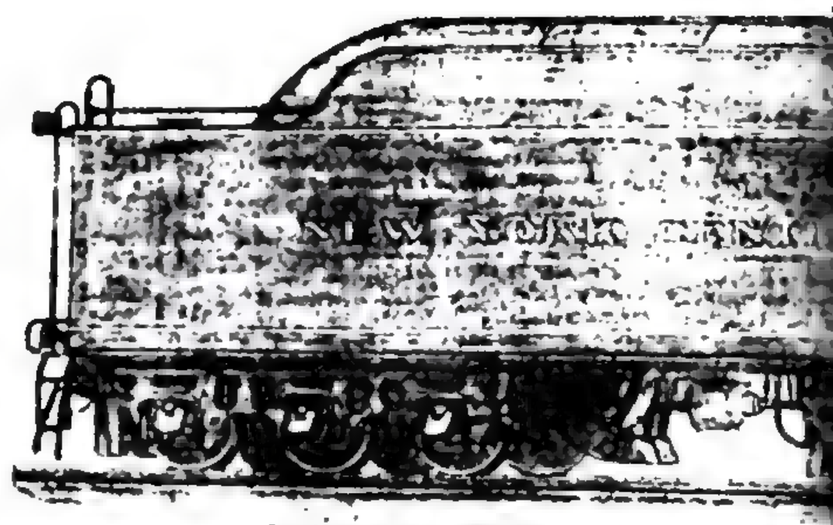
the same sketch, carrying the same date, presented the more familiar plow-like front end [second from top, page 81]. Just 12 days earlier, Pullman-Standard had unveiled Union Pacific M-10000, the first successful streamlined train in America. Two months later, Burlington 9900, later dubbed the *Pioneer Zephyr*, hit the rails. With internal-combustion power plants, these two streamlined trains were groundbreaking on a number of counts. Although the streamlining of conventional steam locomotives had been proposed by some (including industrial designer Otto Kuhler, who in 1928 published his ideas for streamlining an NYC J-1), no such work actually had been carried out.

A review of Kantola's early drawings reveals some surprises. Compared with the *Commodore Vanderbilt* shrouding as actually built, the designs leave a number of the J-1d's pleasing lines to speak for themselves. The running gear and valve motion are very much on display, as are the cylinders, the line of the ashpan, the contour of the tender, and, in the vertical-nose version, even the Commonwealth drop-coupler pilot.

Both sketches show in dashed lines the location of the Elesco feedwater heater,


COWLING BACK OF COAL SPACE
COVER PLATES OVER TENDER COAL SPACE
OPEN OVER WHISTLE & SAFETY VALVES
OPENING OVER BELL OR RELOCATE BELL
RECESS AROUND STACK FOR WIND SCOOP TO LIFT SMOKE
COWLING AROUND STACK
SEMI ROUNDED FRONT PLATE
CURTAINS TO CLOSE OPENINGS BETWEEN ENG & TEND
WIND SCOOP TO LIFT SMOKE
PLATES TO OUTSIDE EDGE OF RUNBOARDS & STEPS
BACK OF STEPS CLOSED FOR WIND SCOOP
OPENINGS FOR AIR TO ESCAPE FROM BACK OF STEPS, IN RUNBOARD
PLATE UNDER PILOT TO CLOSE OPENINGS
PLATE SLOPED UP TO TOP OF PUMP SHIELDS & TO MEET ROUNDED PLATE
PERSPECTIVE BY C. F. Kantola
WITNESS:— F. E. de Great
WITNESS:— E. M. Basford
DESIGN FOR
STEAM LOCOMOTIVE STREAM LINED.
(DIAGRAMATIC)
MARCH. 21, 1934 C.F. KANTOLA





NYC Equipment Engineering Department staffer Carl Kantola prepared a sketch (above) presenting his ideas for the streamlining of a 4-6-4. Features in this March 21, 1934, drawing match those in his side view dated February 24 (top right).

which was standard equipment on the J-1d's. Had any form of streamlining actually been applied to a J-1d, provision would have been necessary for the shoulders of the feedwater heater drum, creating a front-end appearance that would have been quite different from the contours of the *Commodore Vanderbilt*—a J-1e without an Elesco heater—as built.

Details of the streamlining, including features which would lift smoke above the train at high speeds, were further identified in a witnessed diagrammatic sketch dated March 21, 1934 [above]. Among the details specified in this sketch not evident in the February drawings are curtains to close the opening between the engine and tender, and the cowling behind the tender's coal space. The drawing suggests that by March 1934 Kantola still favored the design with the vertical nose and exposed Commonwealth pilot.

Years later, Kantola recalled that Paul W. Kiefer, Central's Chief Engineer of Motive Power and Rolling Stock, was "quite taken" with the idea of streamlining one of his J-1's when he was presented with the sketches. Both Kiefer and W. L. Lentz, Engineer of Motive Power, reviewed the proposed design, making various comments and suggestions. It was at this time that the design acquired one of its most distinctive and elegant features: the great arc in the side panels above the drivers.

Further refinements resulted from a series of wind-tunnel tests conducted at the Case School of Applied Science in Cleveland. Using models, engineers studied the aerodynamics of the design with an eye toward decreasing wind resistance and improving smoke flow.

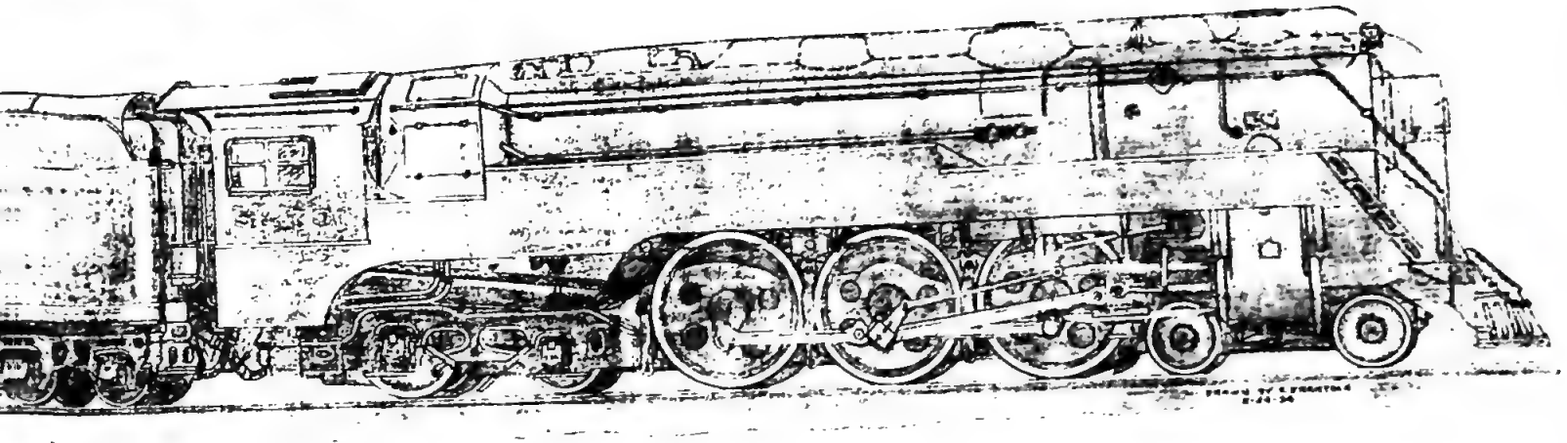
Kantola visited NYC's West Albany Shops early in November 1934. J-1e No. 5344—the last of her subclass, newest Hudson on the road (Alco, 1931), and one of only two J-1's with roller bearings on the driving axles—was in for repairs, so it was decided to give her the streamlining treatment. Kantola then prepared a new sketch, dated November 17, 1934 [third from top at right], depicting the revised streamlining as it would appear on the 5344. This sketch predicted the engine's finished appearance quite accurately.

Although Kantola included disc driving wheels in his February 1934 drawing, the 5344 was outshopped as the *Commodore* with her original spoked drivers, and these appear in the November 17 drawing. Disc drivers were ultimately applied, but not before September 1935, by which time the locomotive had been in service for eight months. The classification lights shown in the November 17 drawing were omitted; a rules change made them unnecessary for passenger locomotives operating on the New York–Chicago main line. Conspicuously missing in the November 17 drawing is the name of the locomotive: *Commodore Vanderbilt*. Instead, the engine's road number is given in the usual manner on the side of the cab. When the sketch was shown to the Central's president, F. E. Williamson, in mid-November, he advised that the pioneer steam streamliner should be named for the founder of the New York Central System. Photos show the finished engine displaying the name, but, curiously, not a number.

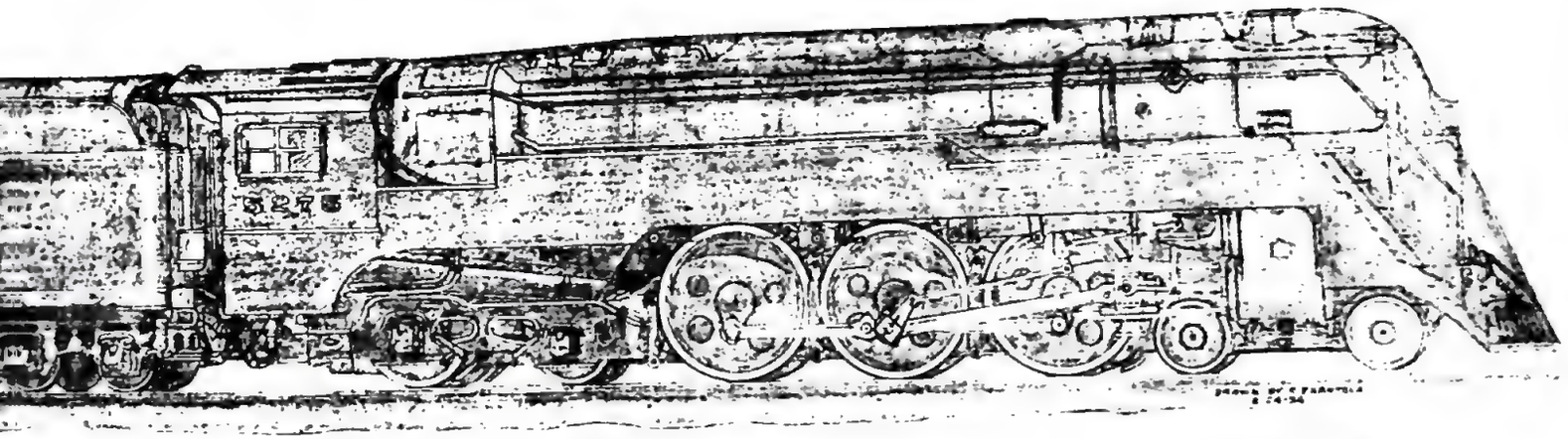
(In early 1936, NYC adapted the *Commodore*'s styling to a 4-8-2, which powered the Rexall Train on a nationwide tour to promote the drugstore chain; the shrouding was removed after the tour.)

MERCURY, THEN *CENTURY*

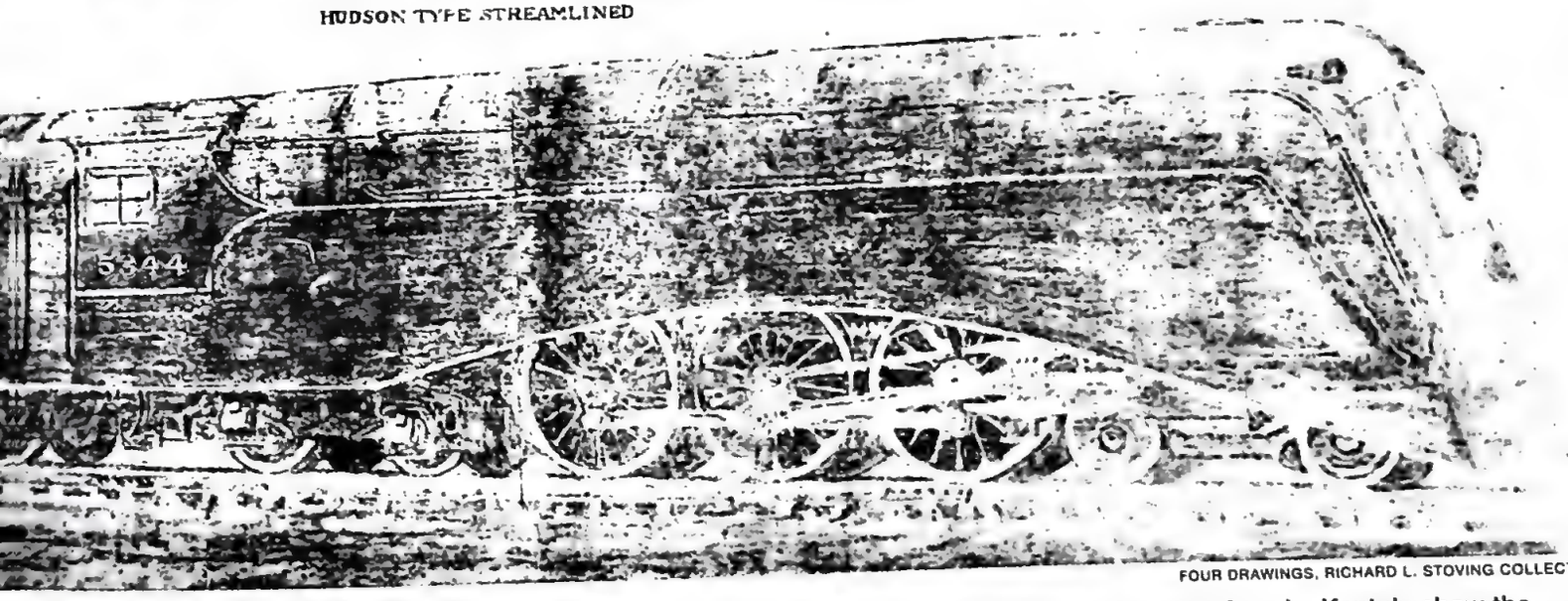
In service the *Commodore Vanderbilt* drew standard heavyweight equipment, but, as the Depression years wore on, it became apparent to management that any streamlining projects would have much more appeal if the new look could be extended throughout an entire train. In 1936, the Central commissioned famed industrial designer Henry Dreyfuss to create the railroad's first all-streamlined train, the Chicago–Detroit *Mercury*, using two K-5a Pacifics and some round-roofed suburban coaches dating from the 1920's.



HUDSON TYPE STREAMLINED



HUDSON TYPE STREAMLINED

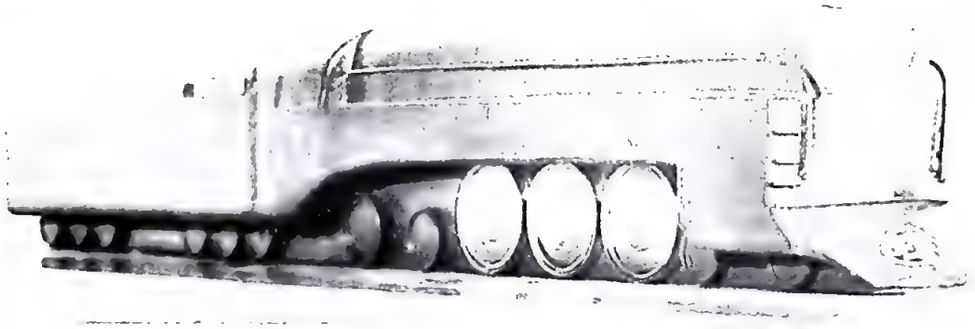


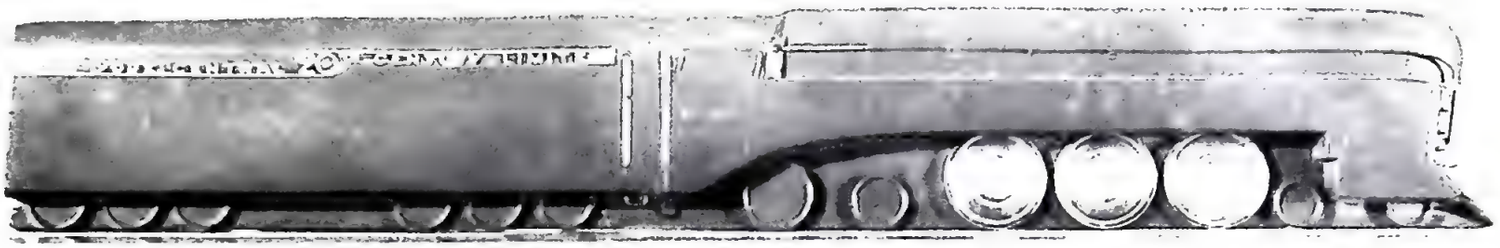
FOUR DRAWINGS, RICHARD L. STOVING COLLECTION

Three drawings by Kantola show the evolution of the *Commodore Vanderbilt* streamlining. Among the features of the top two, dated February 24, 1934, are fully exposed running gear, a skyline casing, and two different nose styles. The November 14 drawing (above), is the final design.

PAUL EILENBERGER

Pacific 4917, one of two streamlined by Henry Dreyfuss in 1936 for the *Mercury*, was fully cowled, like Kantola's *Commodore*. Bumped off the *Mercury* by 4-6-4's, the K-5a's moved to the Chicago–Cincinnati *James Whitcomb Riley* on the Big Four, which required classification lights.





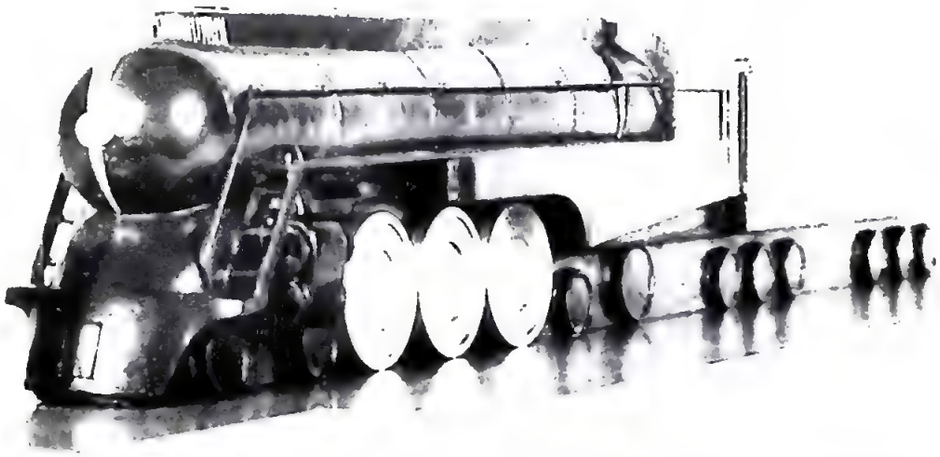
Two views of an early model of Dreyfuss' *20th Century Limited* J-3a design show significant differences from the final version (bottom), which incorporated the famous hemispherical nose with vertical fin.

Success with this project led the NYC to ask Dreyfuss to design a completely new, lightweight *20th Century Limited* for 1938.

Dreyfuss' styling of the 10 J-3a Hudsons for the '38 *Century* constituted a masterful application of late art deco design and have been praised by many as the finest example of steam locomotive streamlining ever. But their appearance may not have been Dreyfuss' original concept. Photographs in the collection of the New York Central System Historical Society show that he first submitted, in the form of a wooden model, a preliminary design very different from the one ultimately adopted.

At least four views of this model have survived, and two are presented here [top and above]. All are marked "File No. 4592 - Original Design of Engine. Not Approved. See File 4599 for Correct Picture." Eight views of a second wooden model, clearly built in the same manner, also exist. One of these, the front view, is marked "File No. 4599. Approved Engine Design - Model." This second model [above right] very closely predicts the *Century* styling as applied to J-3a's 5445-5454.

An 11th Hudson received the *Century*-style treatment. In 1939, J-1e No. 5344, the engine that started it all five years earlier, had her *Commodore Vanderbilt* shrouding removed and was re-streamlined with the distinctive Dreyfuss design, thus becoming the first of only two American steam locomotives to be streamlined twice (Baltimore & Ohio 4-6-2 5304 was the other, in 1937 and 1947). The "new" 5344 was assigned to the *Mercury*.



THREE PHOTOS, RICHARD L. STOVING COLLECTION

NYC's streamlined steam

Road No.	Type	Class	Yr. strmlnd.	Name or train assignment
5344	4-6-4	J-1e	1934 1939	Named *Commodore Vanderbilt* For *Mercury*
2873	4-8-2	L-2c	1936	For Rexall Train
4915	4-6-2	K-5b	1936	For *Mercury*
4917	4-6-2	K-5b	1936	For *Mercury*
5445-5454	4-6-4	J-3a	1938	For *20th Century Limited*
5426	4-6-4	J-3a	1941	For *Empire State Express*
5429	4-6-4	J-3a	1941	For *Empire State Express*

STREAMLINING IN PERSPECTIVE

The last two NYC Hudsons to be streamlined were J-3a's 5426 and 5429. In 1941, for work on the newly streamlined *Empire State Express*, the pair got a treatment somewhat similar to Dreyfuss' 1938 *Century* design, but without the vertical nose fin.

Reviewing New York Central's steam streamlining program from the vantage point of more recent times, critics have often surmised that Kantola's 1934 design for the *Commodore Vanderbilt* covered up too much of the functional handsomeness of J-1e 5344, while Mr. Dreyfuss, working four years later, achieved a more pleasing effect by letting the best lines of the J-3a's show to good advantage. In terms of the

LOUIS A. MARRE COLLECTION

New J-3a 5452 (above) is at the Harmon, N.Y., coal wharf on May 30, 1938, 17 days before the streamlined *Century*'s debut. J-1e 5344 (right, at Detroit in July '39 on the *Mercury*) traded her *Commodore* shell for Dreyfuss styling; lack of Elesco feedwater heater bulges distinguishes her from a J-3a. The *Empire State Express* J-3a's (bottom) built on Dreyfuss' *Century* work.

NEW YORK CENTRAL

locomotives as they actually were streamlined, these may be valid points. But in terms of the two designers' original concepts, the points are indeed arguable. Certainly Kantola's early drawings demonstrate a clear desire to let the steam locomotive speak for itself. And the original Dreyfuss model, an uncompromising cover-up which leaves little hint of the beauty beneath, demonstrates that Dreyfuss was not totally committed to his new, unabashed steam locomotive look by 1938.

In the last analysis, it was surely the temper of the times that dictated much of the appearance of these and other famous streamliners. When one considers the considerable differences in appearance between automobiles of 1934 and 1938, it becomes clear how greatly tastes in streamline design changed in that brief span. The *Commodore Vanderbilt*, the *Century* Hudsons, and the dozens of other streamlined steam locomotives which polished American rails were each honest expressions of all-too-brief moments in our chronology—moments that were gone before we knew they were here. ■

NEW YORK CENTRAL

STEAM *Color*

ROBERT MILNER

STEAM AND BILEVELS–1: One tends not to think of bilevel commuter cars and steam power coexisting, let alone on the same trains, but for a few years it was routine in Chicago. Exhibit A is Burlington Route train 115, westbound at Highlands station, just east of Hindsale, Ill., in July 1952. Pacific 2858, built by Baldwin in 1909 and looking every bit of her 43 years, hauls four bilevel "gallery" cars, built by Budd in 1950 as part of the first order for such equipment anywhere, and an older car.

BARNEY L. STONE, KRAMBLES-PETERSON ARCHIVE

STEAM AND BILEVELS–2: At Clybourn, where Chicago & North Western's lines north to Kenosha, Wis., and northwest to Harvard, Ill., split, E-class Pacific 566 is 3 miles into an outbound suburban run with standard cars and two new bilevels.

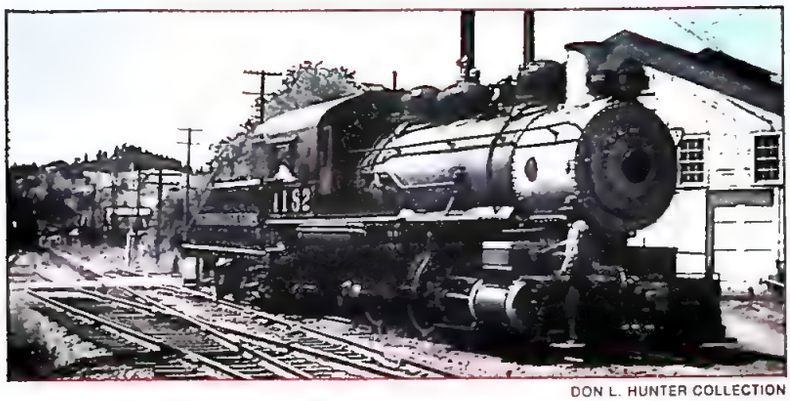
C&NW's first 16 bilevels came from St. Louis Car in 1955, the same year Southern Pacific introduced similar Pullman-Standard cars to its San Francisco commute service. North Western dieselized its suburban trains in May 1956; SP in January '57.

Southern Pacific's

PAINTED LADIES

Pride in the Company: Master mechanics had 0-6-0's that switched passenger terminals dressed up for all to see

BY **TOM DILL**



DON L. HUNTER COLLECTION

First dolled up in 1935, longtime San Jose depot switcher 1221 (below) takes water at the roundhosue ca. 1948; a 2-8-0 replaced her in '52. In Eugene, Ore., in 1940 (above), older 1911 Baldwin S-8 class 1182 works the Water & Electric spur near SP's depot.

RICHARD HOLMES, A. ARMSTRONG COLLECTION

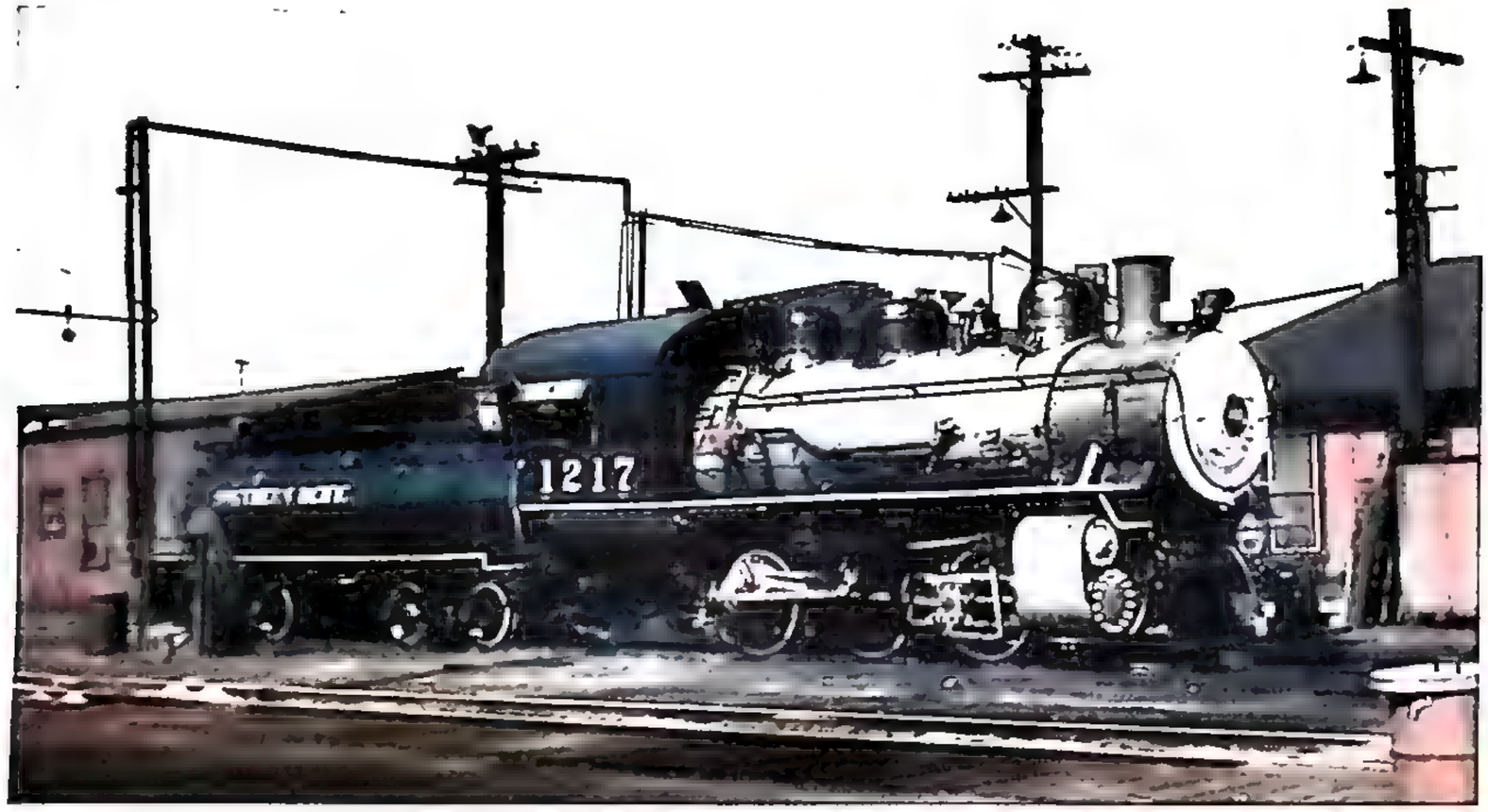
Southern Pacific was well known for its beautiful General Service Northern- and Mountain-type locomotives and the elegant trains they pulled such as the *Coast Daylight*, *San Joaquin Daylight*, *Lark*, and *Golden State*. Less well known were the colorful 0-6-0's employed at some SP passenger terminals.

In the early 1900's, many SP steam locomotives were given special cosmetic treatment which included colorful boiler jackets and cylinder covers, white-trimmed running boards, and other details. This practice fell from favor in the Great Depression as any expense deemed not necessary was cut back. Pride in the railroad and its locomotives was still strong among shop employees, however, despite the hard times. Several master mechanics, who had supreme authority for the practical application of locomotive standards on a particular division, decided to dress up a number of the switch engines assigned to passenger terminal service, where they would be seen by the traveling public. As far as can be ascertained, this practice was entirely unofficial, *i.e.*, it did not originate from 65 Market Street in San Francisco, the company's headquarters.

The resurrection of the practice apparently stemmed from the completion of the new passenger station across from the shops in Sacramento. An article in the March 1927 company magazine, *Southern Pacific Bulletin*, headlined "Sacramento Yard Sports a Highly Polished Switch Engine," gives some insight into what was likely the first 0-6-0 to be "dressed up" after the century's early years. A caption with the photo of No. 1276, with local officials and its day yard crew, read, "This well-groomed switch engine helps to add dignity to the general fine appearances of the new station at Sacramento. Trimmings of nickel plate, copper burnishing, and aluminum paint make it very attractive." People in the photo, taken by Dave Joslyn "of the shops," were W. N. Noonan, foreman; George F. Rupert, stationmaster; John Norton, engineer; A. P. Greimert, fireman; and R. H. Richie and Richard Lane, switchmen.

In part, the article stated, "In keeping with the spick-and-span appearance of everything around the recently completed station and yard, locomotive No. 1276 was given a brand new veneer when it went into the shop for light repairs in the latter part of [1926], and now it fairly glistens. . . . It has attracted much favorable comment from hundreds of passengers . . ."

Details of the decorations were also given. "The following parts . . . are nickel plated: front and back cylinder head



JACK HAMMOND

JACK BOWDEN

An immaculate 1217 is "on spot" at Oakland in the late 1940's (top). Near the end of steam, on April 27, 1956, the 1226 posed in downtown Fresno (above) flanked by Railway Express trucks and a Greyhound bus.

casings; front and back steam chest head casings; bell; governors; blowdown valve; injector checks; injectors; number plate and numbers; bright parts on both headlights; and all fixtures in the cab. Main and connecting rods are polished, also the guides, valve rods, and levers. The edges of the running boards on both engine and tender are painted with aluminum paint. The branch pipes from injector to checks are of copper highly burnished. The smokebox and stack are painted with aluminum paint."

The practice of decking out in special attire spread in the early 1930's, on a number of 0-6-0's and a handful of other small locomotives. The splendor displayed by the passenger "goats" was created by shop forces, work generally done in between other more urgent jobs during what was sometimes called "available time." There was no standard for these jobs, and each shop's product differed. Even the colors used on the boiler and cylinder jackets were different, because the painters at each location mixed their own paint from a series of standard pigments. Thus did the paint and the schemes vary according to the eye of the individual painter, and the details that each shop was able to bestow.

The colors seemed to vary among shades of green, gray, and blue, and many engines' cab roofs were painted an oxide or tile red. Some, like the 1261 and 1289 assigned to the Los Angeles Division, were simply painted a gloss black, given nickel-plated lettering, and then kept highly polished by shop forces and engine crews. Other details included bright-red cab window sash and doors; raised, polished bronze, stainless-steel, or nickel-plated lettering; nickel- or brass-plated cylinder covers and handrails; aluminum-painted smokebox; polished copper injector piping; and white or aluminum-painted running-board trim and driver and wheel tires.

Some of the switchers displayed an enameled Southern Pacific "Sunset" herald on the side of the cab, just ahead of the window. One locomotive, the 1276, at one time had a brass eagle atop the front headlight visor, and the 1221 had an air horn below the stack on the engineer's side until the late 1940's. In all, more than 30 engines were dressed up at one time or another, and over the years the Western Division seemed to have the largest number of decorated switchers. The practice continued until almost the end of SP steam operations.

The last engine to be dolled up was most likely the 1272. It had been transferred to the Western Division from the Portland Division in 1953, and by 1955 was selected to be painted with gray-green boiler and cylinder jackets and aluminum-painted cylinder-head covers and trim. It remained decorated for just a short time, reverting to black by mid-1956.

BARRY ANDERSON

Western Division stalwart 1270 works the Oakland Mole in 1954; in '56 she lost her fancy dress and went to the Coast Division.

Portland Division vet 1271 went to Oakland in '53, where she is towing a Pullman in fall 1955, shortly before being repainted black.

DALLAS GILBERTSON

These little goats were ideally suited for use around passenger terminals. Enginemen remember them as being a pleasure to fire and run. They generally steamed freely and rode well, though only at speeds below 25 mph. Exceeding that, the lack of a lead or trailing truck caused them to "hunt" from side to side as they trundled down the track. They surpassed diesels at making "drops" and kicking cars, since their short piston stroke and small drivers enabled them to have quick acceleration.

George Thursby, a fireman on the San Joaquin Division, recalled that when making a drop with a 1200, the engineer would open the throttle all the way, and when he got the signal to give the switchman some slack so he could pull the coupler pin, he would not shut off the throttle but instead would grab the reverse lever and pull it slightly over center. When he got the signal that the coupler pin had been pulled, he'd move the reverse lever all the way forward, and the 1200 would accelerate like a scalded cat.

Even in the mid-1950's the S-12 (Nos. 1247-1284) and S-14 (1285-1295) classes were still considered to be fairly modern steam engines, having been built between 1919 and 1924 in SP's own shops at Sacramento and Los Angeles and by Lima Locomotive Works in Ohio. As late as January 1956, no fewer than 53 SP 0-6-0's were still earning their keep on the system,

RICHARD LOHSE COLLECTION

CARL SIMPSON; A. ARMSTRONG COLLECTION

Best-looking goat on the Coast Division was the 1278, shown fresh from the shops circa 1946 (top) and on February 14, 1954 (above), eight months before the end of her 20-year career at the San Francisco depot.

most assigned to the Western, Coast, and San Joaquin divisions.

By the mid-'50's, though, the number of "painted ladies" had dwindled to seven, as all the others had been repainted black or scrapped. Oakland terminal on the Western Division hosted the 1217, 1270, 1272, and 1276, while the Coast Division had the 1221 in San Jose and the 1277 and 1278 in San Francisco. They were kept in tip-top shape and were the pride of local shop forces and enginemen. The San Joaquin Division paint shop foreman did spiff up some 0-6-0's with aluminum paint trim and cylinder covers, and though they stood out, they lacked the luster of the others.

Barry Anderson well remembers the "painted ladies." He recalls, "When I first went firing on SP's Coast Division in 1953, the 1277 and 1278 were still the spiffiest-looking switchers in the San Francisco terminal, even though they had lost their raised chrome cab numbers, tender lettering, and cylinder-head covers. Resplendent in blue boiler jacket, aluminum smokebox, and multicolored SP herald on the cab, they worked the Third and Townsend depot and were the pride of the roundhouse and engine crews. It was not uncommon to see an engineer or fireman, 'on spot' or 'at beans,' using his free time to polish the side of the cab with cotton waste.

"In the twilight of steam," Anderson continues, "many of SP's remaining switchers were poorly maintained, with loose cylinder packing and leaking steam, rods clanking with every turn of the wheels, but not so the 1277 and 1278. Shop forces kept them tuned and tight. They both fired cleanly and ran like well-oiled sewing machines. During the morning commute rush, you would see them bustling around the station, following an inbound commute train to couple onto the rear car just moments after it had arrived at the terminal, then pulling the whole string of cars out to the coachyard until needed for the outbound rush in the evening. SP's premier trains, the *Daylight*, *Starlight*, and *Lark*, had to be turned on the wye at Mission Bay each trip. The sight of one of the little 0-6-0's struggling out of the station with 12 or 14 cars in tow, reverse lever down in the corner and exhaust shooting skyward, was always a David and Goliath performance."

E. J. Gaede, similarly, has fond memories of at least one dressed-up 0-6-0: "The 1270 will always have a special place in my heart. I made my date on this engine at Mission Bay yard on a 6:30 job on June 6, 1956. I had just been marked up on the firemen's extra board the evening before. I'd slept in my DeSoto, parked next to the board office, and took my call there. When you're 21, you can get a good night's sleep just about anywhere!

"Since I got a rather long call," Gaede relates, "and probably had a day-old peanut-butter sandwich for breakfast, I got to the

DALLAS GILBERTSON

The 1277, usually the standby engine for 1278 (which she outlasted), switches the *Lark* at Third and Townsend in October '54.

J. C. HAMMOND; A. MENKE COLLECTION

Likely the first 0-6-0 to be dolled up in the '30's, 1276 for years worked in Sacramento. On March 15, 1953, she posed in Oakland.

1270 early and cleaned the cab with the steam hose. Someone had shown me how to do this on one of my student trips. When the engineer arrived, he was surprised, for firemen rarely cleaned up the cab in those days. The job we had was working the leads into Mission Bay yard, and we were in view of the roundhouse most of the day. I told the engineer this was my first trip, and he made quite a to-do about it, giving all kinds of helpful advice. One item I recall was, 'If you want to see Proudfit [the Road Foreman of Engines] real quick, just smoke the engine, and he'll be right here.'

"It was a pleasant day, except that when we were at beans we took the 1270 to the roundhouse and exchanged it for the 1300, an Alco diesel. What a letdown that was; it was the first diesel switcher I had been on, as all my student trips had been on steam. There was nothing for me to do except look in the direction we were headed and keep alert for anything to prevent damage or injury, or a wrong switch."

By summer 1956, the game was over for the 0-6-0's, as even the few remaining "painted ladies" were either back in all black or retired. A couple kept their raised lettering and Sunset heralds until they were set aside at the end of steam operations late that year. The 1221 was the only one of the group saved, donated to the city of Deming, N.Mex., in 1960, where it resides today, still with its raised nickel-plated cab numbers.

STEAM Color

DOUBLE YOUR PLEASURE: Two of Western Maryland's 50 husky H-9 Consolidations, all delivered by Baldwin in the early 1920's, lead the 125-car morning freight out of Ridgely, W.Va., yard on March 15, 1952. The sharp-looking duo is bound for Elkins, W.Va., on a line where seven H-9's, each packing 71,500 lbs. of tractive force, were needed to hoist a 78-car coal train through 12- to 20-degree curves and up the 3 percent grade in Blackwater Canyon [pages 62-62, Spring 2002 CLASSIC TRAINS].

DAN POPE COLLECTION

A MILE A MINUTE: Not much of the old Buffalo, Rochester & Pittsburgh was good for 60 mph, but the unknown photographer of this Baltimore & Ohio local noted that Pacific 5243 was accomplishing that as it left Pittsburgh for Buffalo with a classic consist of RPO, two storage cars, and a coach on February 15, 1954. The 4-6-2 was one of 15 Baldwin P-6's built in 1922. The train left the Steel City as No. 521 at 9:15 a.m., changed direction at Butler to 252, and arrived Buffalo at 7:05 p.m.

Green GIANTS

CHARLES E. WINTERS; LOUIS A. MARRE COLLECTION

From atop Rich Mountain, Ark., on May 15, 1943 (top), the geography dwarfs KCS 2-10-4 907 with a southbound freight of about 45 cars. We're probably seeing all the way into Oklahoma in the photo. In 1945, sister 908 smokes it up leaving Kansas City (above).

Kansas City Southern's stylish Super-Power 2-10-4's were a successful departure from the norm, but destined for short lives

BY **PETER A. HANSEN**

JACK AVERY; LOUIS A. MARRE COLLECTION

Kansas City Southern never has been a typical railroad. Dreamers with a flair for promotion were standard-issue among 19th century railroad builders, but only Arthur Stilwell received his visions direct from the spirit world. His sprites and "brownies" didn't tell him to build west like almost everyone else. Instead, they instructed him to build south, from Kansas City to the Gulf of Mexico. (They knew what they were doing: Kansas City Southern became the shortest route to tidewater for Midwest export grain, and it didn't hurt that the Spindletop oil gusher was discovered in Texas less than four years after Stilwell's line was opened in 1897.)

The company's motive power was different, too. Who else refused, as a matter of principle, to convert compound articulateds to simple, even into the 1930's? Who else put 2-8-0's on steroids, wouldn't equip them with automatic stokers despite a prodigious appetite, and saw little need to run trains at double-digit speeds? Who else had a locomotive fleet nearly devoid of trailing trucks, sacrificing grate area in exchange for maximum weight on drivers?

And who else nearly let the Super-Power era pass by, having to wait for a change at the top before placing an initial order?

KCS did—but it wasn't quite unique. If all of this sounds a lot like the Delaware & Hudson, there's a reason. His name was Lenor F. Loree. To understand how remarkable the KCS 2-10-4's were, it helps to know how radically they departed from 30 years of Loree's dominance.

A TALE OF TWO RAILROADS

Loree may have been the last of the old-time autocrats. Born in 1858, he was a product of Rutgers University, the U.S. Army, and the Pennsylvania Railroad—the last two of which were sure to reinforce his native instincts. He was appointed president of the Baltimore & Ohio when the Pennsy assumed ownership in 1901, and that is where he had his first chance to indulge a lifelong obsession with motive-power efficiency.

One of the results was America's first Mallet articulated, an 0-6-6-0 known as "Old Maud"—the biggest locomotive on earth when she rolled out of American's Schenectady plant in 1904. Of more lasting significance, she fostered the rise of the Walschaerts valve gear in the U.S.

Old Maud was dispatched to push trains up B&O's Sand Patch grade in Pennsylvania, where she did the work of two 2-8-0's. For Loree—a man of Scottish ancestry to whom the common stereotypes of thrift

The evolution of KCS mainline steam power is shown here, from the top. In 1933, 0-6-6-0 No. 707, built at Schenectady in 1912, flaps along with a freight at Cedar Grove, La.

C. W. WITBECK

ABOVE, WILLIAM K. BARHAM; BELOW, LOUIS A. MARRE COLLECTION

In the mid-1940's, a KCS "redball" freight (above) roars through an Ozarks dell near Joplin, Mo., behind 2-8-0 563 and 2-8-8-0 758. Ready to leave K.C. on November 23, 1949, are J's 906 and 900, separated because of weight restrictions on bridges.

The crow almost took a detour

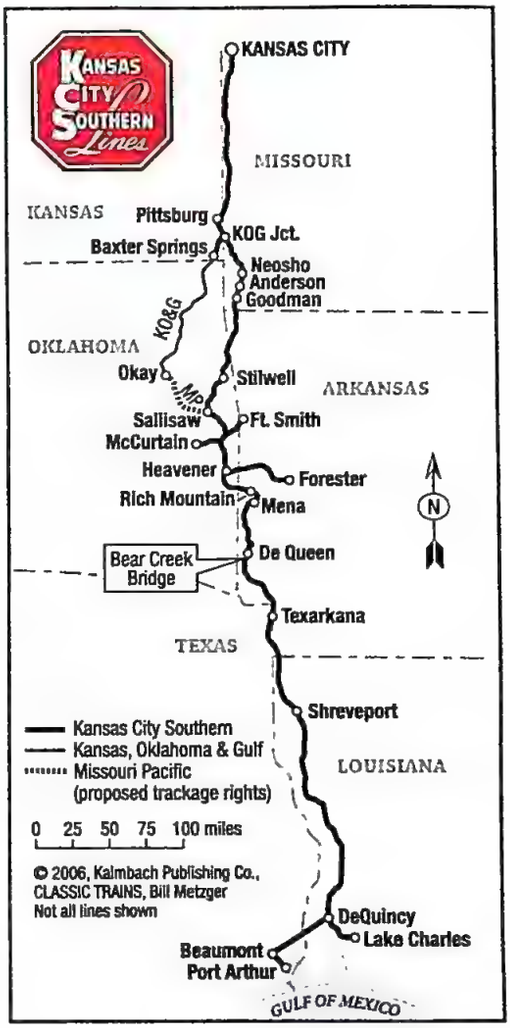
Arthur Stilwell's "brownies" had told him to build the shortest possible route from Kansas City to the Gulf, which made for some unfortunate encounters with mountains along the way. KCS liked to say it ran "straight as the crow flies" (and ran a passenger train named *Flying Crow*), which was true from the perspective of a high-level map. On a topographical profile, however, the line had three major grades: 4 miles of 1.8 percent for southbound trains out of Neosho, Mo.; 15 miles of 1.74 percent for northbounds between Anderson and Goodman, Mo.; and Rich Mountain, with its 25 miles of 1.36 percent grade southbound, just north of Mena, Ark. These grades had been the main reason for KCS's reliance on compound articulateds, but in 1919 and most seriously in 1936, the railroad flirted with a more permanent solution.

The plan would have involved an upgrade of KCS's Baxter Springs branch, which peeled off the main line in southeast Kansas and dead-ended at its namesake town. From there, KCS would purchase the Kansas, Oklahoma & Gulf line to Okay, Okla., near Muskogee, and use trackage rights over Missouri Pacific to Sallisaw, where KCS trains would rejoin their main line. The new route would have circumvented the grades around Neosho and Goodman, but not Rich Mountain.

The 1936 plan was more than just a twinkle in the chief engineer's eye. A $1.5 million purchase price had already been negotiated with KO&G, and KCS had also agreed to pay $385,000 to reduce grades on the Missouri Pacific. The new route would have been 21.4 miles longer than the old one, but it would have cut the ruling grade from 1.8 percent to 0.5, reduced curvature by 2,229 degrees (more than six full circles), and decreased the total rise and fall of the line by 775 feet.

This low-grade route may be the greatest "what-if" in KCS history. The total cost was put at $3,602,485, so the road calculated the payback period under several different scenarios. Assuming 1935 levels of only 10,000 gross tons per day, it would have taken 122 years to recoup the investment. At pre-Depression 1928 levels, the figure was a more reasonable 12.5 years. Still, no one knew how long the Depression would grind on when the study was done in 1936, and in the end, the plan was shelved.

It's too bad nobody had a crystal ball. Less than six years after the study, the U.S. was embroiled in World War II, and for the KCS, that meant unprecedented volumes of Texas petroleum products on the line, bound for points north and east. Much of this traffic had been carried by ship before the war, but with Nazi U-boats lurking in coastal waters, it ended up on the rails. If KCS had been able to see this traffic coming, the fate of the low-grade route would almost certainly have been much different. Many of the railroad's steepest grades were reduced in later years, but not as much as the alternate route would have achieved.—*Peter A. Hansen*



emphatically applied—this meant the equivalent of two locomotives with only one crew. With all of Old Maud's weight on drivers, she was indeed a powerful beast.

(In an interesting historical coincidence, Loree's inspiration for Old Maud was an encounter with a double-ended Fairlie 0-6-6-0 on the Mexican Central, a line that now is part of Kansas City Southern de Mexico. Loree also did some survey work in 1881 between Laredo and Saltillo, and that line also now is part of KCSM.)

Loree became KCS board chairman in 1906, a position he held for three decades, and his tenure as president of D&H (1907-1938) covered most of the same years. He left his mark on the locomotives of both; their rosters were dominated by legions of 2-8-0's, which grew improbably larger throughout the Loree years. The Consolidations weren't very glamorous, and they certainly weren't fast, but they had adhesion . . . and on these two mountain railroads, adhesion was the name of the game.

The theme of adhesion was also seen in the Mallets on the D&H and KCS rosters. Most had no leading or trailing trucks, the better to keep maximum weight on drivers. D&H had 13 0-8-8-0's, which it used as pushers, and KCS stabled 17 2-8-8-0's. KCS also had perhaps the rarest of articulateds—a dozen 0-6-6-0's used as road engines despite not having a lead truck to guide them through curves and switches. The brutes didn't need them, since they typically slogged along at less than 10 mph. Still, they could lug almost anything up the mountain, and KCS was noted for its long and infrequent trains—which once again saved money on crew expenses.

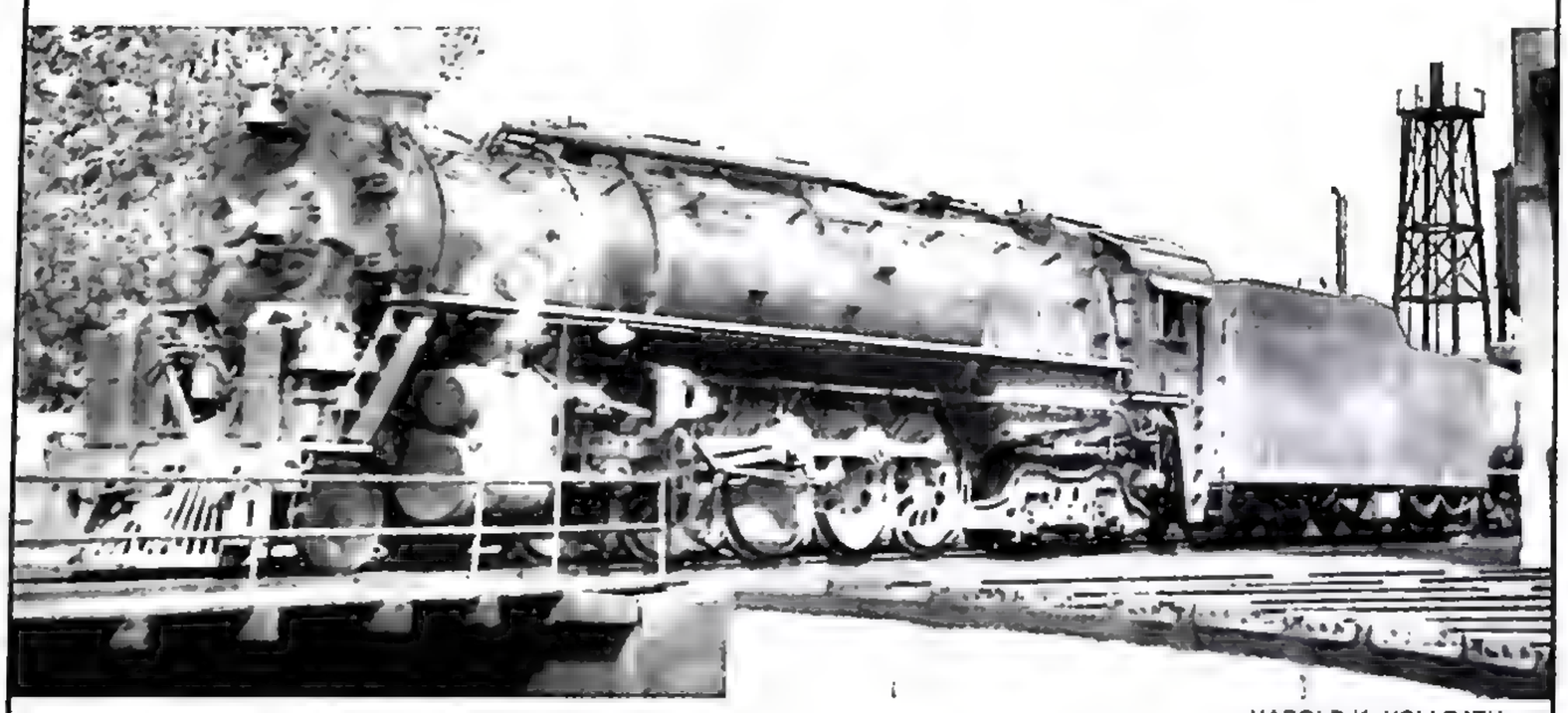
In the drag-freight era, when the railroads were content to lug huge trains at slow speeds, adhesion was paramount. So, therefore, was weight on driving wheels. Speed was unnecessary, and in any case, it would have required more steaming capacity, which would have meant larger fireboxes, the use of trailing trucks to support the bigger grates, and thus a smaller percentage of the locomotive's total weight on drivers. All of these factors marched in lockstep with each other, and this old thinking was the antithesis of Super-Power.

Not that there was anything wrong with the old principles *per se*. Loree probably wrung as much productivity from a pound of steam as any executive of his time, but times were changing. By the 1920's, railroads no longer had a near monopoly on freight transportation, thanks to the trucking industry and the new taxpayer-subsidized highways. Trucks offered door-to-door flexibility and better over-the-road speeds, and 20-year-old 2-8-0's literally could not keep up.

KCS was seeing the light, even while Loree was still chairman, as evidenced by three major initiatives from 1936 that culminated in the J-class 2-10-4's.

The first initiative was the inauguration of manifest freight service between Kansas City and Port Arthur, Texas (named for the founder). The need to mount a credible response to the trucking industry was the

LOUIS A. MARRE COLLECTION



HAROLD K. VOLLRATH

KCS's 2-10-4's, exemplified by 904 (above) at DeQueen, Ark. (the southernmost point the 900's could serve) in June 1938, were based on Lima's T-1 class 2-10-4's for Chesapeake & Ohio, represented by 3013 at Columbus, Ohio, in August 1949.

main reason for offering the faster schedule. Less-than-carload freight (l.c.l.) was interchanged with the Frisco at Neosho, Mo., most of it having originated in Chicago or St. Louis. More l.c.l. traffic was interchanged to Texas & Pacific at Texarkana, bound largely for Texas and California.

Southbound manifest train 77 was faster than its northbound counterpart 88, covering the 786 miles between Kansas City and Port Arthur in just over 33 hours. KCS had no fast freight engines on its roster in 1936, so it upgraded a dozen of its newest 2-8-0's and pressed some 4-6-2's into freight service. In the demanding terrain between Pittsburg, Kans., and DeQueen, Ark., doubleheaded Pacifics were the rule.

The second major initiative was a 1936 line relocation study. Stiff grades in southwestern Missouri were tantalizingly close to much flatter ground, so the study quantified the cost and payback period for relocation. In the end, mired in the Great Depression and in need of many other upgrades, KCS decided it couldn't afford the project [previous page]. The study did have one lasting result, however—it led directly to the decision to buy the 2-10-4's. That was the third major initiative.

KCS wanted to move tonnage faster; there would be no retreat from that. And, since the grades weren't going anywhere, there was only one answer: Super-Power.

NORTHERNS ON THE KCS?

The road's motive power philosophy had changed dramatically in just a few months, but the J-class 2-10-4's were not inevitable. In fact, the line-relocation study made several projections about the speed, power, and operating cost of a modern steam locomotive—which was assumed to be a 4-8-4. (The study offered detailed specifications for this hypothetical Northern, and they were very close to the Lehigh Valley 4-8-4's. Loree's D&H once owned nearly 50 percent of the Valley, so it's intriguing to imagine a connection, but there's no evidence to support one.)

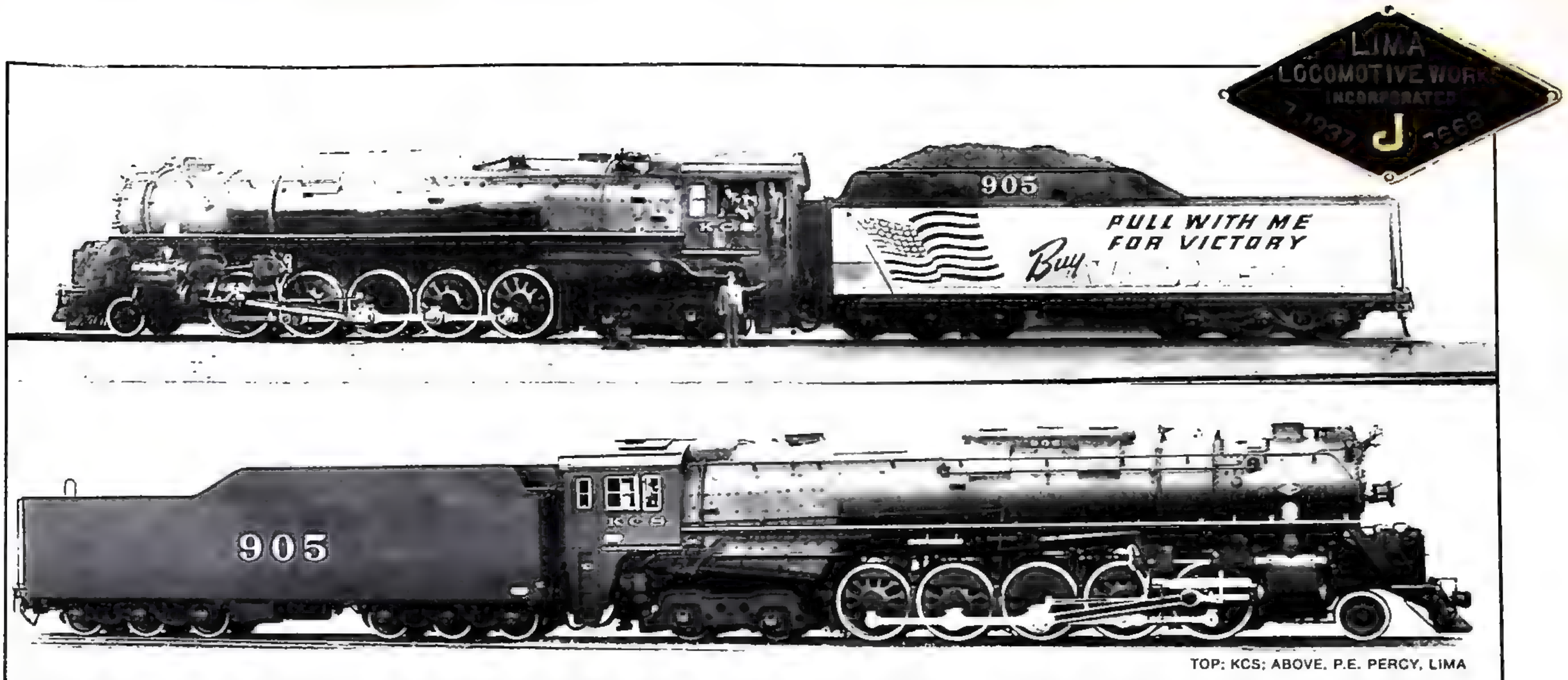
Sometime between the chief engineer's study in February 1936 and the J-class order in November of the same year, KCS decided to buy 2-10-4's instead of 4-8-4's. The railroad had three major design criteria, and in the end, that's what drove the decision to go with ten-coupled power.

Speed was probably at the top of KCS's wish list. In addition, however, the road's older bridges and a few stretches of 112-pound rail argued in favor of light axle loadings, so a fifth set of drivers would be desirable. The extra drivers also helped satisfy the third major criterion: adhesion for the grades.

Those same considerations were largely responsible for Lima's pioneering 2-10-4, built for the Texas & Pacific in 1925 (the wheel arrangement was known as the Texas type thereafter). Essentially, it was a stretched version of Lima's breakthrough 2-8-4 Berkshires [see pages 8-19], and it was done in order to provide better weight distribution while increasing tractive effort. (There was actually one 2-10-4 prior to Lima's design for T&P. In 1919, the Santa Fe asked Baldwin to use a four-wheel trailing truck on the last locomotive in an order of 2-10-2's. Oxymoronic as it sounds, the result was just that: a 2-10-2 with a four-wheel trailing truck. The firebox and evaporating surfaces were the same as the other engines in the order, and there was no attempt to apply Super-Power concepts.)

The T&P's Texas types had relatively low 63-inch drivers for traction, but they suffered from counterbalancing problems: there wasn't enough room on those small drivers for counterweights adequate for high-speed running. When Chesapeake & Ohio put 69-inch drivers under its 2-10-4's, however, it had a machine that could handle freight at passenger-train speeds. The C&O T-1 class became the starting point for most subsequent 2-10-4's, including Kansas City Southern's.

Working together, Lima and KCS shaved nearly 30 tons from the engine weight of a C&O T-1. Tractive effort was almost identical in spite of the weight reduction, and it may actually have been a little higher for the KCS engines. Officially, the J-class had a tractive effort of 93,300 pounds, versus 93,350 for C&O's T-1's. However, dynamometer tests showed that the J's actually exceeded their theoretical rating under certain real-life conditions. This feat was due in large measure to an increase in the boiler pressure from 265 pounds to 310, which enabled the KCS machines to get more power out of every piston thrust. The boiler pressure matched Santa Fe's 2-10-4's, and it was the highest ever used on a Texas



TOP: KCS; ABOVE, P.E. PERCY, LIMA

KCS 905, in her builder portrait and with a World War II slogan. The J builder plates were Lima's only ones depicting engine class.

type. The 310 pounds of pressure turned out to be too much of a good thing, though. The resulting thrust was enough to knock the drivers out of quarter and break the rods, so pressure was reduced to 300 pounds shortly after the 900's entered service. Tractive effort dropped accordingly, to 93,000.

The first five, Nos. 900-904, were oil-burners, and they usually ran through from Kansas City to DeQueen, Ark., 433 miles. The next five, 905-909, burned coal, and they were changed out at Pittsburg, Kans., or at Hea-vener, Okla., after runs of 129 or 338 miles, respectively. The latter engines were used on the Kansas City–Pittsburg First District because of the ready supply of coal at Pittsburg. None of the 900's ran south of DeQueen, since the Bear Creek Bridge just outside town could not support their weight.

"I COULDN'T BELIEVE MY EYES"

From Kansas City Southern's perspective, the 900's were a hit. They immediately shoved the 0-6-6-0's aside, all but three of which met the scrapper's torch in a matter of months. And though a 900 offered only 75 percent of the tractive effort of a 2-8-8-0, the 2-10-4's were much faster.

Don Campbell, a 44-year KCS employee, recalls a World War II-era performance by the 909, handling a troop train south from Kansas City. The big 2-10-4 had 19 or 20 heavyweight Pullmans tied to her tail, and she was dispatched only 30 minutes ahead of the diesel-powered *Southern Belle*. Campbell was a signalman working just north of Pittsburg, and he was on the lookout for both trains. When the 909

Kansas City Southern's other 900's

J. H. WESTBAY

No. 901, shown in Kansas City in 1927, was the smaller of KCS's two Shays.

Throughout the Loree years, Kansas City Southern was a loyal Alco customer, so choosing Lima to build the 2-10-4's was a break with tradition.

The J's weren't the first Lima power on KCS, however. In 1913, the road purchased a pair of three-truck Shays to switch the industrial spurs on the north side of Kansas City's downtown. They were numbered 900 and 901, which raises the question of whether the J's got those numbers on purpose 24 years later. Did someone in the motive power department have a sentimental regard for the old sidewinders from Lima?

The site that became Kansas City was originally a bluff on the south bank of the Missouri River. In the late 19th century, the bluffs were pared down from a precipice to a slope, but it was still a very steep one. Shays—those denizens of the logging camps—could be counted on to scale the 3 percent grades, and to handle the tight turns and street-running in the warehouse district.

No. 900 was the largest Shay that Lima ever built, with a total length of 52 feet 11 inches, 18x20-inch cylinders, and tractive effort of 74,400 pounds. Sister 901 was slightly smaller. The 900 was scrapped in December 1928, and the 901 followed four months later. Their duties on the streets of Kansas City were assumed by booster-equipped rod engines; beginning in 1939, the job was worked by NW2 diesel switchers from Electro-Motive.

The line has been abandoned for several years now, and its last customer was a Folgers coffee plant. The plant is still active, and KCS still plays a part in delivering the beans. These days, they come from Gulf Coast ports in containers, but they ride rubber tires for the last few miles.—*Peter A. Hansen*

PRESTON GEORGE PHOTO, COURTESY JOE COLLIAS, FROM LOUIS A. MARRE COLLECTION

Tackling Rich Mountain in far western Arkansas, KCS's greatest geographical stumbling block, in 1939 is J-class 901. She'll work to DeQueen, Ark., where a light bridge forced the 900's to turn back.

blasted past his location—119 miles from Kansas City—she was still 29 minutes ahead of the *Belle*. That works out to an average speed of 60 mph for the sustained run. The J's were rated at 5,000 tons on this First District, so a 1,600-ton train was not a challenge; still, performances like these showed what Super-Power and 70-inch drivers could do over a long haul.

Apart from their advantages to the operating department, the J's had esthetic qualities to gladden the heart of any locomotive connoisseur. Vestibule cabs, 40-inch pilot wheels, and a 112-foot length gave them an imposing presence, offset somewhat by a single, low-profile dome that lent just a suggestion of streamlining. The 900's were satisfying to the ear, as well. Their deep, steamboat whistles were a radical change from the high-pitched, European-style whistles found on other KCS engines (Loree liked the single-chamber whistles because they used less steam).

Happily, however, one other Loree legacy was adopted for the 900's: Kansas City Southern's distinctive sea-green boiler jacket. The Old Scot had a taste for European styling, and just as with the D&H, colored boiler jackets were part of that. Charging across the prairies of the First District under a full head of steam and a canopy of light exhaust, the 900's offered a spectacle unlike anything else in southwestern freight power.

They made an impression on the young Don Campbell, right from the first time he saw one. "I had just graduated from high school in Neosho in May of 1937," he says, "and I was working in a drugstore on the northwest corner of the square. It was the first Sunday in July, and just as I got to the front door, I heard this whistle that didn't sound like anything I'd heard on the KCS before. I ran down the street three blocks to the tracks, and I just couldn't believe my eyes. I hadn't known they were on order."

SYMBOLISM AND SUBSTANCE

For KCS, the 900's arrived just in time. The manifest freights would be in good hands, as would the crush of traffic during World War II. The road was so pleased that it considered buying more of the J's from Lima in 1948. Ultimately, though, KCS purchased Electro-Motive F units instead. The 900's were the last steam locomotives KCS bought new (though the railroad would buy 10 secondhand 2-10-2's from Ann Arbor and Wabash to help with the war traffic), and they were the last 2-10-4's built by Lima, the company that had done more than any other to develop the type.

The J's lost their green paint sometime after the war, but continued as the backbone of Northern Division (K.C.–DeQueen) freight service until their retirement in 1952 and 1953. They were barely 15 years old, and all were scrapped at Pittsburg.

Kansas City Southern's 2-10-4's, like the Texas types on most other roads, were among the most vulnerable to dieselization. They were built to haul freight at high speeds for long distances—the kinds of assignments favored for new diesels. KCS had been an early and enthusiastic buyer of EMD's products, so the 900's were on borrowed time from 1950 on.

The case has been made that some of the railroads that bought Super-Power couldn't take advantage of the speed it offered, and that they might have been better off with a more conventional engine. KCS's Northern Division offers no clear answer to that argument, since the open country north of Pittsburg offered ample opportunity for fast running, while the mountain districts did not.

One thing is beyond dispute, however: Kansas City Southern's 2-10-4's had symbolic importance, above and beyond the substantive issues. In a January 1, 1937, letter to employees, President Charles Johnston viewed the 900's as part of a trend that bespoke the nation's, and the railroad's, recovery from the Great Depression. (He wasn't kidding when he said the railroad was recovering—a 1938 internal report would find that fully 33 percent of KCS's rolling stock was purchased the previous year.) Beyond that, the 900's were a clear break with the previous three decades of KCS power: they weren't drag engines, they weren't hand-fired, and they weren't Alcos. Apart from the Pacifics, they were the only power on the property in 1937 with trailing trucks, the only locomotives with four-wheel trailing trucks, and the only ones with a grate area big enough to need them. They were—and would always be—Kansas City Southern's only Super-Power.

The 900's proclaimed to employees and shippers alike that Kansas City Southern had entered a new era. If the railroad was looking for symbolism, it couldn't have chosen a more—pardon the pun—powerful expression. ■

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Photo by Tom Danneman

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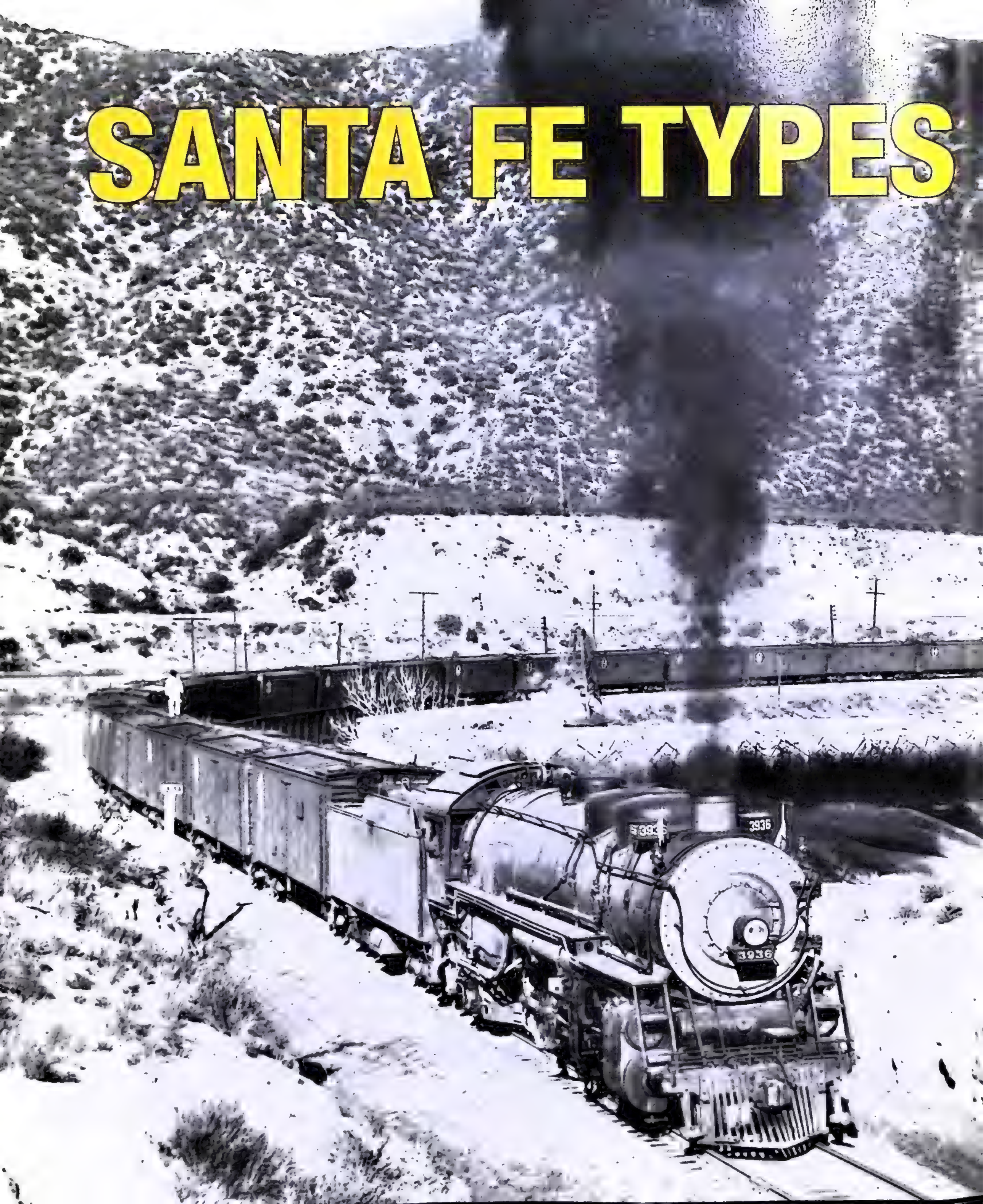
BARNEY L. STONE KRAMBLES-PETERSON

ON THE WATERFRONT—NORTHWEST: Now that the ferry from Vancouver is in, Pacific Great Eastern 2-8-2 160 can put triweekly train No. 1 together at Squamish, British Columbia, on July 12, 1948, for the 20-hour, 347-mile run to Quesnel (Kwuh-NELL), end of the line at the time. The train had coaches, sleepers, a diner, and summer, open cars. PGE, begun in 1912 and taken over by the province in 1918, pushed on to Prince George in 1952 and filled in Squamish–North Vancouver in '56.

W. B. COX, KRAMBLES-PETERSON ARCHIVE

ON THE WATERFRONT—SOUTHEAST: A little-remarked late U.S. steam operation was that of West Palm Beach Terminal at the Port of Palm Beach, Fla. Here, WPBT Army-style 0-6-0 No. 11 is loading ex-West India Fruit & Steamship Co. carferry *Grand Haven* (a former Grand Trunk Western Lake Michigan boat) for Havana on July 3, 1959, six months after Cuba nationalized WIF&S. The WPBT was agent for Norfolk, Va.-based WIF&S, which also had run a New Orleans–Havana ferry.

SANTA FE TYPES



ON THE SANTA FE

Working freight over Cajon Pass in the 1940's

The old steam engineers were a dedicated and innovative bunch who were always trying to figure out the best and easiest way to get the train over the road

BY **JACK O. ELWOOD**

TWO PHOTOS, HERB SULLIVAN

Santa Fe type 3936 leads a three-engine train of Valencia oranges up Cajon Pass (left); note the "swingman" atop the fourth "reefer." Sometimes, a helper might be mid-train (above), but this was not encouraged.

In the steam era, I was employed in engine service by the Atchison, Topeka & Santa Fe, out of San Bernardino, Calif. (locally, "San Berdoo"), a city 56 miles east of central Los Angeles, on Route 66 and at the foot of Cajon Pass. Santa Fe was a big employer in town, with massive locomotive and car shops that employed about 800 to 1,000 people at the time. The shops followed the plans of, and were built shortly after, the ones in Albuquerque, N.Mex., which were completed in 1914.

The shops handled complete locomotive maintenance, from repair to rebuilding, with a machine shop foundry and an overhead crane that could lift a locomotive. Outside the shop, transfer tables could relocate a locomotive from one of the seven bay tracks within the building. The car shops at the east end of the complex could repair, rebuild, re-wheel, repaint, and do all necessary maintenance on rolling stock. No one who lived in San Bernardino could forget the steam whistle on the power-house, which sounded the time at 8 a.m., 12 noon, and 4 p.m. It could be heard all over town, a tradition that united the community even if only for a few seconds a day.

Typically I would run steam-powered freight trains east from San Bernardino, up through Cajon Pass to Barstow, out in the Mojave Desert 81 miles away. For our explanatory example, let's make up a GFX, a Green Fruit Extra. In the late afternoon and evening, local freights and turns would be called to work out of San Bernardino to Riverside, Redlands, Corona, Fullerton, Orange, Upland, Pomona, and other towns with citrus packing houses. Before urban sprawl, much of southern California was planted in citrus, primarily oranges and lemons. These locals gathered up refrigerated boxcars ("reefers") loaded with lemons in winter months (November to June), navel oranges in summer, and Valencia oranges from May through September.

When these trains returned to San Bernardino in the early morning, yard crews would switch the loaded reefers to the ice dock next to the ice house, at the "B" yard. Ice in 300-lb. blocks was fed from the ice house by a giant chain conveyor to the ice dock and the spotted carloads of oranges. The ice bunkers on each end of the reefer were filled with the broken blocks of ice by the ice-loading gang, then salted down to retard melting. When 65 to 67 loads were iced, the yard switch crew would make up a train in the yard, usually filling up one track and part of another.

When the train was made up, the yardmaster would call the crew office and tell them to call a GFX for, say, 10 a.m. The crew clerks would then call the crews: a conductor, three brakemen, and four engine crews, consisting of four engineers and four firemen. The tonnage had been figured by the yardmaster, and for a train this size, four locomotives would be required to handle it up Cajon. Sometimes one of the helper engines would be placed in the middle of the train, but this was not encouraged as the train would take a delay at Summit extracting it. The other option was three engines on the head end.

A normal GFX train had the "train engine" (which would go on to Barstow) and the head-end helper up front, with two helpers on the rear end. If the caboose had a steel underframe, the rear helpers would

ROBERT HALE

Eastbound rear-end helpers 3880 and 3856 have just passed Summit station on Cajon.

couple on behind it, but if it had a wooden underframe, the helpers had to be cut in ahead of it.

With the train made up and the crews called, we would go to the roundhouse to get our engines. After a train was made up, the yardmaster notified the roundhouse foreman of the tonnage—he'd know the engine requirements. He checked his available engines, selected four in this case, and told the hostlers to get them ready. Generally the train engine was a 3800- or 3900-class 2-10-2.

The four engine crews assembled in the register room and listed their train in the outbound register book. Every workday, an engineer registered his watch and compared time with the standard clock. The roundhouse clerk marked the engine numbers on the blackboard, along with which crew was assigned to which engine.

The fireman was the first out on his engine, to check supplies, the water level in the tender, the fuel amount (Santa Fe in the area burned oil, not coal), sand supply, the firebox interior, flagging equipment, flags, and markers. He took the squirt hose that emitted a mixture of steam and water and washed out the cab. He filled the hand oiler, provided a ball of waste made of shredded rags, and had everything ready for when the engineer arrived at the foot of the gangway steps to hand up his grip.

The grip used by most steam engineers was a steel case loaded with everything needed to get over the road, from tools, wooden plugs, and gaskets to rain gear. A fireman lifting this case straight up into the cab could get a premature hernia. When the fireman got the case stored behind the engineer's seat, he handed his superior the long-stem hand oiler, with a ball of clean waste tucked into the handle; if it was nighttime, he also handed down a lit kerosene torch so the engineer could see the holes to oil the engine's running gear.

After the engineer finished his inspection, and as the crews of the other engines finished the same rituals, all would be ready to leave the roundhouse. For our GFX train, the head brakeman and another brakeman known as the swingman came from the main San Bernardino yard office—where the train crews, consisting of conductor and brakemen, reported for duty—and were ready to take the engines, coupled together, to the "B" yard.

We had to proceed through the west tower interlocking. Probably the west end yardmaster had called the tower and told the operator to line us to the "B" yard. A GFX was usually too long for one track, so its head portion was on, say, track 1 and the rear portion on track 3. The two engines for the front cut off from the two rear-end helpers and coupled onto the head portion of the train. The swing brakeman took the other two helpers down the "B" yard lead and into track 3, where they coupled onto GFX's rear portion. This GFX's caboose had a steel underframe, so the helpers coupled on behind it.

Each engineer had his mark to cut out helpers, and woe be to anyone who moved it

A yard engine then entered track 3 and coupled to the rear portion of the train, pulling the cars, caboose, and helpers out over the track 1 switch. We then shoved our front portion back onto the rear portion, making a complete consist. The air-brake hoses were coupled up, and when the train air was charged, a brake test was made. Carmen inspected the entire train, making sure the brakes were being applied and released. Radio communication had yet to be adopted, so all signals among locomotive, caboose, and carmen were by hand, by whistle, or if at night, by lantern. The helper engine crews could tell by watching their air gauges when the brakes were being applied or released by the lead engineer. When the brake test was completed, the blue flag that protected the car inspectors while they did their job was removed from the lead engine.

READY TO GO

The GFX was ready to head east. The tower operator, when he heard two long blasts of the lead engine's whistle, lined the switch for the main line and gave a yellow signal. When the rear helper engineers heard the whistle, they slowly opened their throttles to start shoving the train, then when the drawbar slack came against the lead engines, those engineers opened their throttles and started pulling. Starting the train from the rear end eliminated the chance of it breaking in two. If you started from the head end, stretching out the slack could cause a break-in-two.

As the train started moving slowly out of the "B" yard, it faced an uphill grade. Then beyond the west tower, the main line went downgrade. The lead helper engineer, who handled the train to Summit (top of Cajon Pass), had checked his orders, making sure there was time to be out of the way of any passenger trains.

The helpers shoved the train until they passed the San Bernardino passenger depot, where a pot signal and a switchtender at the 15-mph crossover, under the Mount Vernon overpass, governed movement to the left-hand main track. Normal running eastward up Cajon Pass was on this track until a point between Thorne and Frost where the westward track crossed on a bridge over the eastward track to resume right-hand running.

After the train's rear end cleared the crossover, the rear helpers really started to work. Most of the train was on the uphill grade along "I" Street (now Interstate 15), and even with the helpers working full throttle, didn't exceed the limit on the 20-mph curve just east of the San Bernardino depot. As the rear end of the train cleared the curve, the head end was going around the curve at Highland Junction about a mile away. As the grade increased, the speed decreased, soon down to 6 to 9 mph.

First stop for a GFX was Keenbrook, necessary to slake the engines' thirst even though only 12 miles from San Bernardino. The 3800's had a 15,000-gallon water tank, the 3900's 20,000-gallon tanks. Steam

TWO PHOTOS, STAN KISTLER

Two 2-10-2's lead a westbound up the east side of Cajon near Victorville on June 11, 1949 (above). On the same day, the 3855 (right) leads a 75-car train a mile east of Cajon station. Before Santa Fe got F3's, in early June its FT's would go to Bakersfield to move potatoes, resulting in virtually every freight over Cajon reverting to all-steam.

locomotives on passenger trains used 70 to 120 gallons of water per mile, while those on freight used 150 to 350 gallons per mile.

On most trips, because of the time required to take water, a freight would have to take siding at Keenbrook in order to clear at least one passenger train. Eastbound, the sidings going up Cajon Pass were Devore, Keenbrook, Cajon, Alray, and Summit. There was a water plug at Cajon, but I don't remember ever taking water there on freight.

Upon arrival at Summit, a GFX cut out its helpers. Engineers on the hill each had their mark for stopping their train so the helpers could be cut out and move through the crossover to the eastbound siding. A mark could be a fencepost, a certain rock, or a similar landmark, for lengths of 25 cars, 50 cars, and so forth. And woe be to any trackman or section foreman who moved one of those posts or rocks!

If the head-end helper received orders at Summit to go to Victorville, he cut off from the GFX's train engine, put up markers and white flags, and ran light ahead of the GFX, because some time would transpire getting the rear helpers cut out and making the required air-brake test before leaving Summit. A light engine could run at 40 mph to Victorville.

After the GFX was coupled up, the engineer gave one long whistle blast to indicate the brakes were being set. In the caboose, the conductor watched the air gauge and noted if the brakes were applying back there. After sufficient time for all brakes to have set, the engineer sounded two long whistle blasts and released the

Taking a high-wheeler down the hill

Many helper engines worked Cajon Pass, since virtually all eastbounds out of San Bernardino needed at least one extra engine. All the passenger trains got a helper, and the helper engines could be almost any class of locomotive. Many were fresh out of the backshops and came out with new rod bearings or other repairs. A trip or three to Summit and back served as a break-in to see how they worked and kept them close to the shops if anything was wrong.

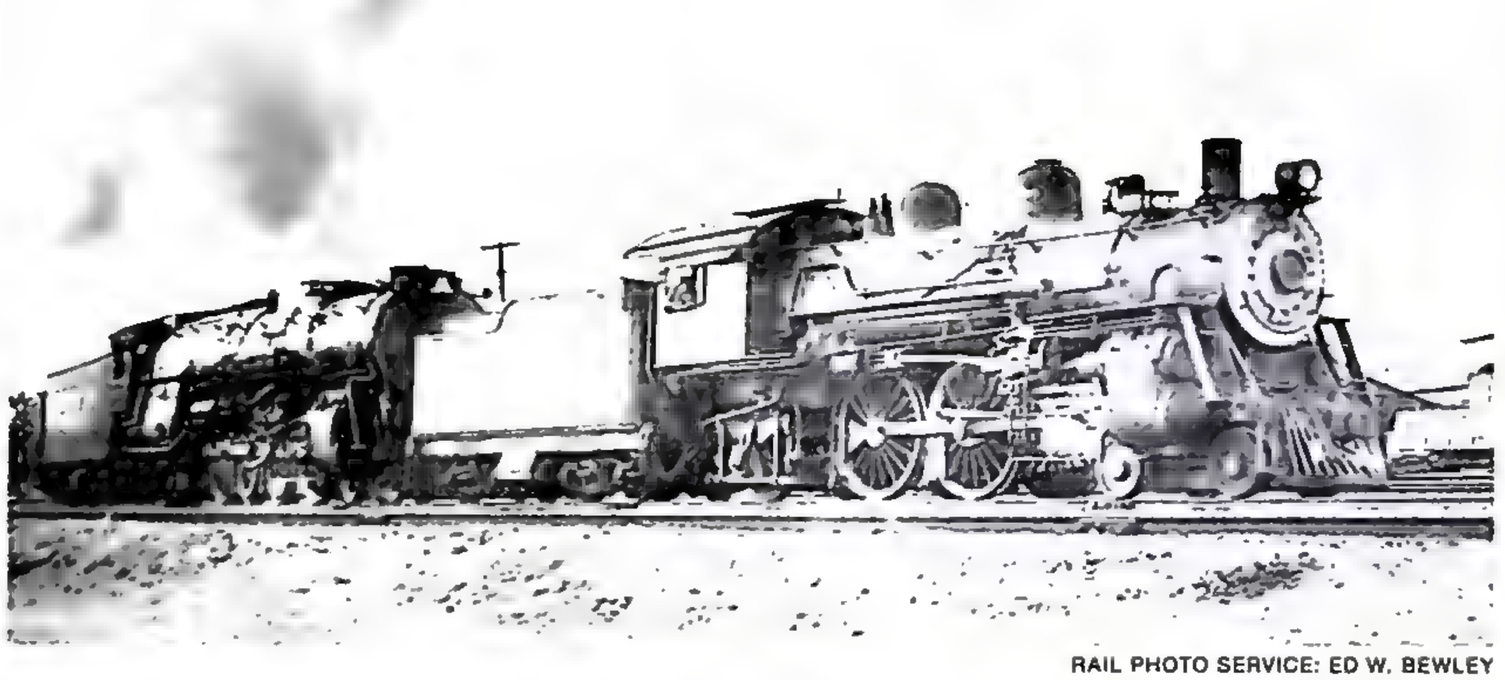
I once was called as engineer to help No. 20, the *Chief.* The engine I was given was the 1468, a 4-4-2 Atlantic type with 80-inch drivers. She wasn't real strong but had enough power to help No. 20 with its all-lightweight consist. We cut off at Summit, where operator and well-known rail photographer/historian Chard Walker gave us a message to go back light to San Bernardino. We knew that's what we would be doing, because the 1468 wouldn't be much help on freight out of Victorville.

It was a problem to get the old girl down the 3 percent with the braking power she had—just two driver brakeshoes on each side and brakeshoes on the tender trucks. Plus, she was fleet-footed and wanted to roll.

We went easy out of Summit, with brakes applied, because she would pick up fast. Quickly, my lessons from the "old heads" cut in. I put the reverse lever in the back-up position and went down the grade on compression—in other words, the pressure on the pistons in the cylinders had a retarding effect and kept our speed under control, sort of a steam-era dynamic brake.

Years before the dynamic brake, that's the way one got a high-wheeled engine down the hill. The procedure was against the rules, but I'm sure the supervisors knew this was taking place, because each of them had undoubtedly done the same thing. This didn't seem to bother the 1468, as, after her stint on Cajon, she went right to work as the regular engine on the San Bernardino–Los Angeles local.

Charlie Ochoa was the regular engineer, and the train made many station stops. We would ask Charlie, "How do you get her to stop with the braking power, Charlie?" He would say, "I just put her in 'little' big hole." That's emergency brakes, as there is no such position—only full emergency. It was Charlie's way of describing how he got stopped, without saying he put the train into emergency. This happened at every station stop!—*Jack Elwood*



RAIL PHOTO SERVICE: ED W. BEWLEY

With probably a light-engine move back down the hill ahead of her, Atlantic 1468 rounds the curve out of San Bernardino ahead of 4-8-4 3770 on a passenger train.

train brakes. The conductor noted if the brake-pipe pressure was being restored and the brakes released, then gave a hand or light signal to proceed. The engineer sounded two whistle blasts, and the GFX left Summit.

After another stop for water, at Victorville, it was on to Barstow on a mostly water-grade line except for a short pull at Helendale, then level again into Hodge and Lenwood and into Barstow yard. The engineer pulled into a long yard track to the east end, cut the engines off, and took them to the roundhouse inbound track.

In those days, for engine and train crews, in Barstow as at any away-from-home terminal, it was a no-frills life. We were on our own—no taxi service, no air-conditioned motels, etc. The railroad provided a reading room with barracks-like accommodations and a bed at a cost of 50 to 75 cents. Some of the old-timers had rooms rented in private residences in town, while some had caves dug into the side of a hill in Barstow. These usually had a bed-sized area with a door covering the

Swingman was a dangerous and not very desirable job, riding atop the cars

entrance. They were cool in summer and cold in winter, and they were bought and sold when the engineer owner retired, or were passed on to other engineer friends.

Engine crews in the "hill pool," San Bernardino to Barstow, worked on the basis of first in, first out. For example, if you came into Barstow "four times out," you'd be on the fourth train called west for San Berdoo. Sometimes you had long layovers, sometimes short ones, depending on the train traffic. There was no pay for the layovers at either end.

RETURNING WEST

We were called for the SCX, Southern California Extra, a regular merchandise train, and assigned a fresh 3800-series 2-10-2 at the roundhouse (freight steam locomotives always changed at terminals). After the train was inspected and the terminal air-brake test was made, we were ready to leave Barstow. Train orders told the crew to clear the main line at Victorville for a passenger train; the crew figured the running time and estimated they'd be able to make Victorville in time.

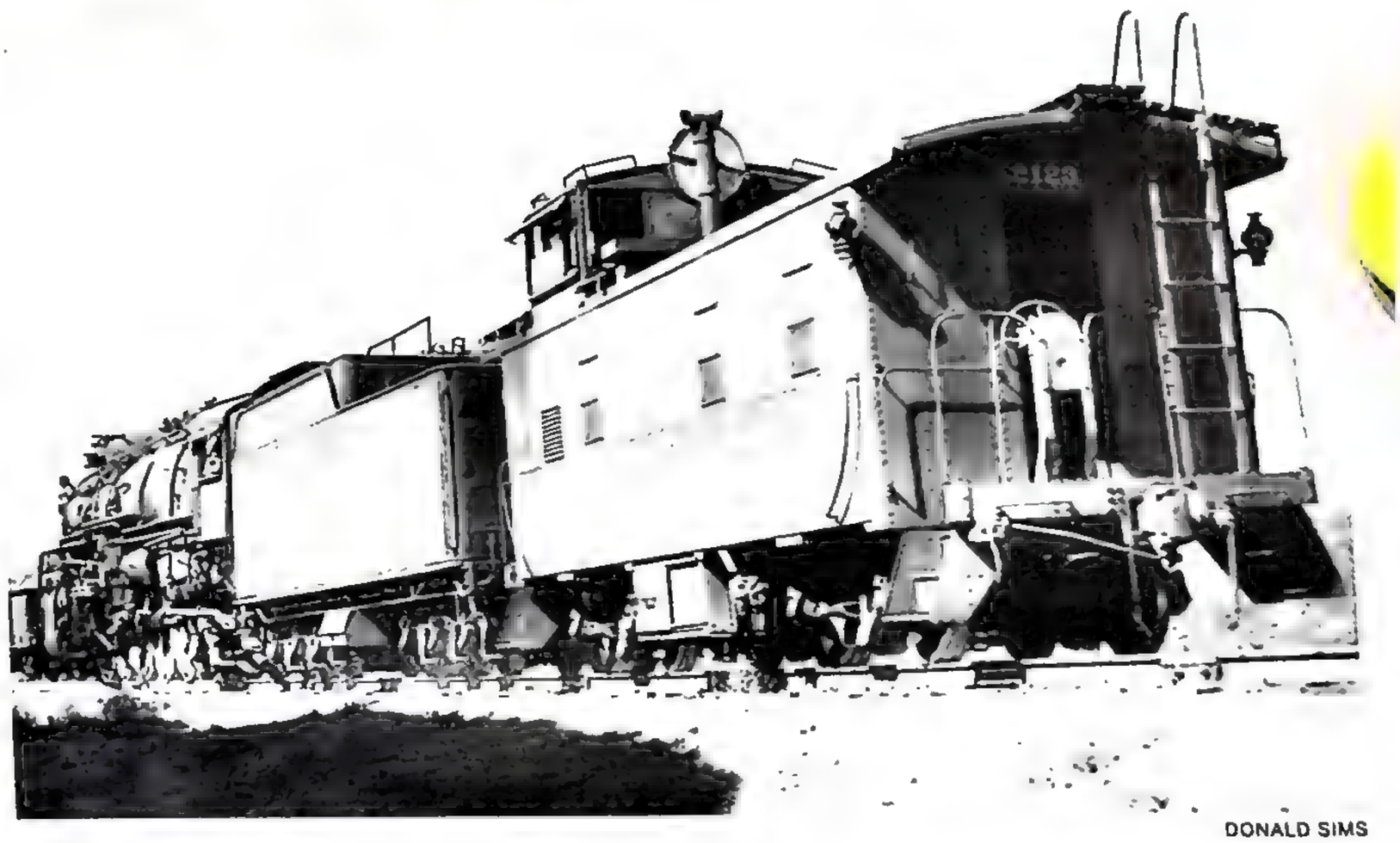
Unlike on the westbound trip, the engineer had to work full throttle leaving Barstow, as it was an ascending grade. Westbound, the sidings to Victorville were Lenwood, Hodge, Helendale, Bayman, and Oro Grande. Often, we had time only to go to one of these short of Victorville.

Once at Victorville, SCX headed into the westbound siding to clear for No. 19, the *Chief,* stopping the engine at the water plug to fill the tank. A helper coupled on in front to go to Summit. Because the helper engineer took over the train brakes, a standing air-brake test had to be made. After 19 passed, SCX departed.

If the SCX didn't have to clear a passen-

ROBERT HALE

Brakeshoe smoke wreaths a train descending Cajon Pass behind the 3879 in February 1951 (above). Cabooses could be placed ahead of, or behind, a rear helper (as is this one in September 1949), though those with wood underframes had to be rearmost.



DONALD SIMS

ger train at Summit, it kept to the main track to the west end of Summit before stopping to cut off the helper. After another standing air-brake test, the head brakeman and swingman turned up the retaining valves on the cars. Low pressure was 10 pounds, high pressure 20, with train tonnage governing where the retaining valve was positioned.

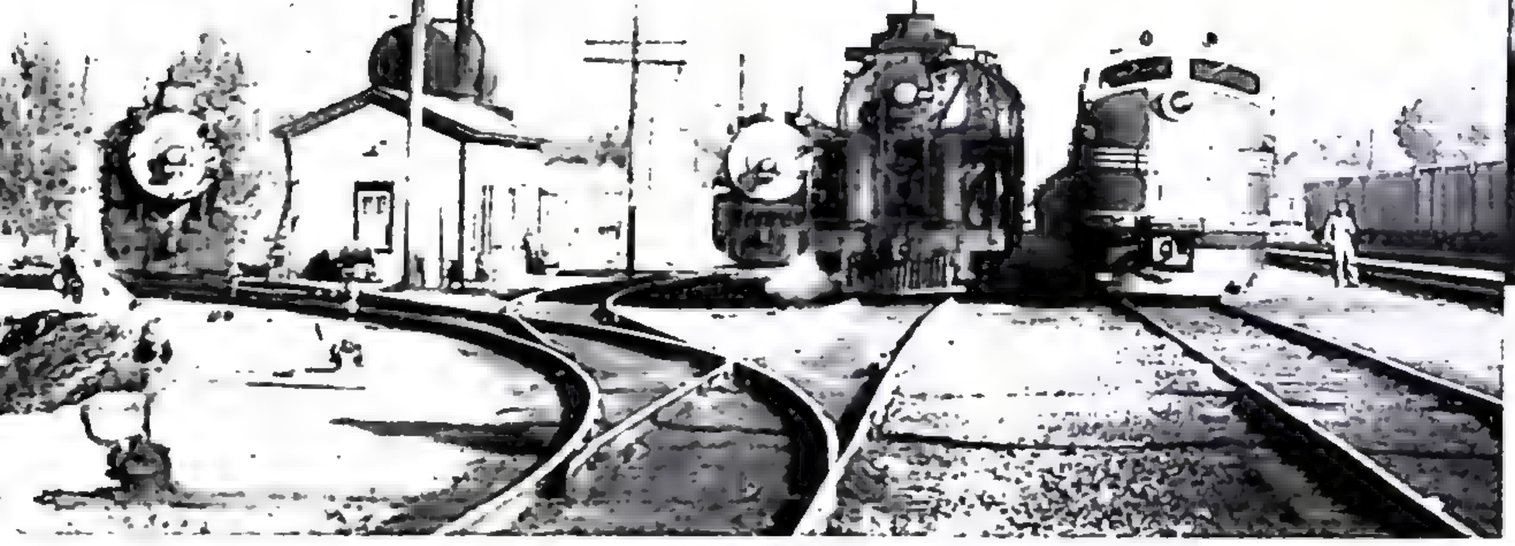
At this time in the early 1940's, some cars still had staff brakes. Extra brakemen, on the hill only, were called swingmen. They rode atop the boxcars with a brake club, a hickory stick used to set the hand brakes if needed, cinching the brake strap with the club to ensure a tight brake. The swingman was also to keep watch for any trouble going down the hill. It was a dangerous and not very desirable job, riding out atop of the cars in all kinds of weather.

The 3800's were equipped with a cross-compound steam-operated air pump, with the main reservoir on a high pressure of 140 psi; low pressure was 130 psi. Descending from Cajon summit separated the true engineers from "the hogheads," a slang term from the old days perpetuated by trainmen. Most westbounds used the original track down Cajon Pass, which had a grade of 3 percent. The advice from old-time engineers was, "Never leave Summit at a speed over 10 mph." If you did, you'd be in deep trouble before the whole train got on the 3 percent downgrade. Successful train-handling depended on keeping the speed low, avoiding having to set too much air, which would cause the train to bog down and create the necessity of releasing the brakes prematurely. There was no margin for error—you couldn't afford to waste air.

One of the methods of train-handling at

DONALD SIMS

Cajon Pass terminals, west to east (top to bottom): A street bridge afforded a fine view of the San Bernardino roundhouse area, evidenced by the night scene with 2-10-2 3882 next to FT diesels. Union Pacific had rights on Santa Fe over Cajon to Daggett, just beyond Barstow, and two UP helpers, LA&SL 2-8-2 2733 and UP 2-8-8-0 3559, flanked AT&SF 2-10-2 3895 at the Victorville helper terminal as the FT's on "Motor Extra 125 West" were ready to tackle the climb unassisted. Santa Fe type 3839 rested at the Barstow roundhouse.



FLETCHER SWAN

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the time was "short cycling," that is, setting the brakes, reducing speed, releasing and then recharging the brakes, then setting them again to start the same cycle, repeated all the way down the hill. Another, used by some old-timers, was the feed-valve method, which would increase brake-pipe pressure from 90 pounds to 95; this was against the rules, because the increased brake-pipe pressure could rupture a weak air hose. Some engineers would use the "bridge method," implemented by meticulously manipulating the brake-valve handle to a precise spot on the brake-valve rotary, wherein the main reservoir air pressure would be able to feed through one small port opening into the brake pipe, to take care of brake-pipe leakage and thus maintaining proper braking reduction without causing an increase in the brake-pipe pressure, which would result in retarding and stalling train movement.

A steady train speed was desired. The bridge method was against the rules, but ironically, in time, Westinghouse and New York Air Brake both realized that this method could be used to advantage on mountain grades. They incorporated this position on their new brake valves. Then it wasn't against the rules, and in fact was strongly dictated to be used.

Going down Cajon Pass, westbound freights with retainers stopped to cool their wheels at Cajon siding for 10 minutes, and again at Devore. A trail of smoke followed the train down the hill. Westbounds yarded their train in the "A" yard at San Bernardino, cut the engine off, and took it to the inbound lead at the roundhouse.

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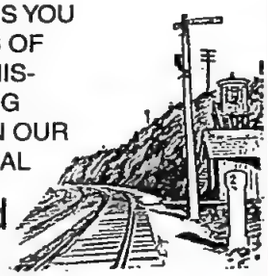

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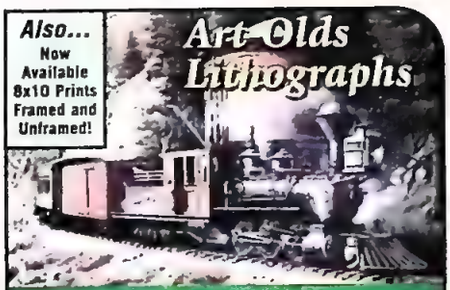

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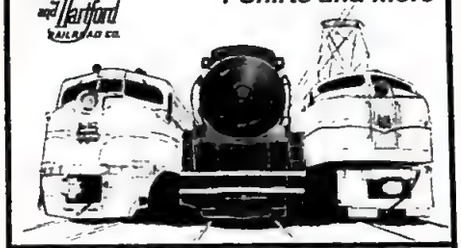

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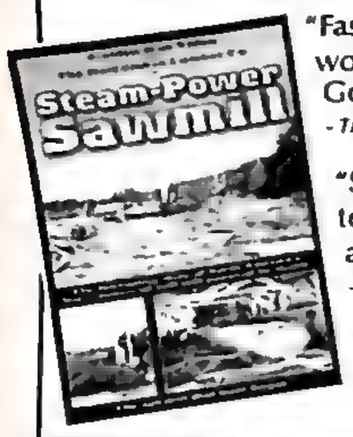

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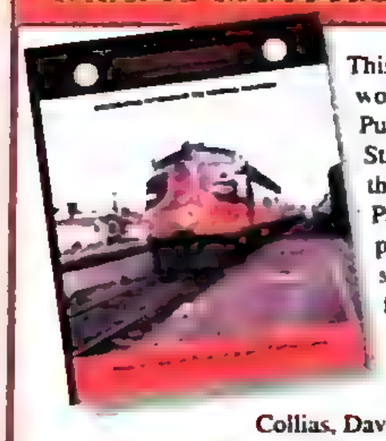

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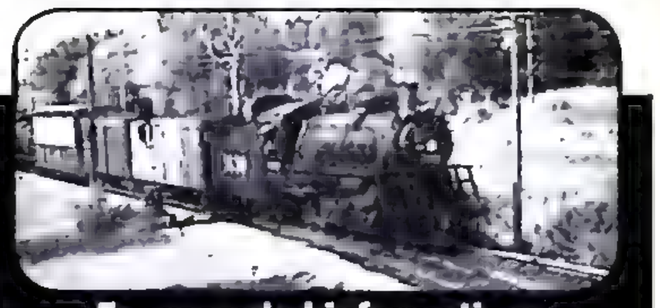

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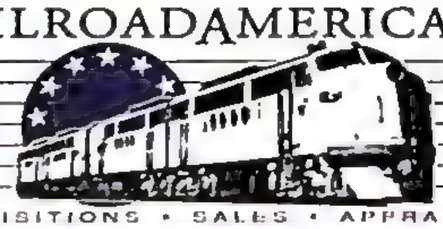

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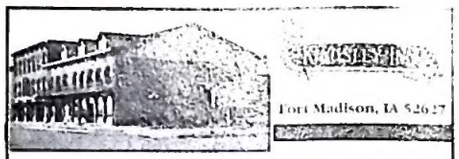

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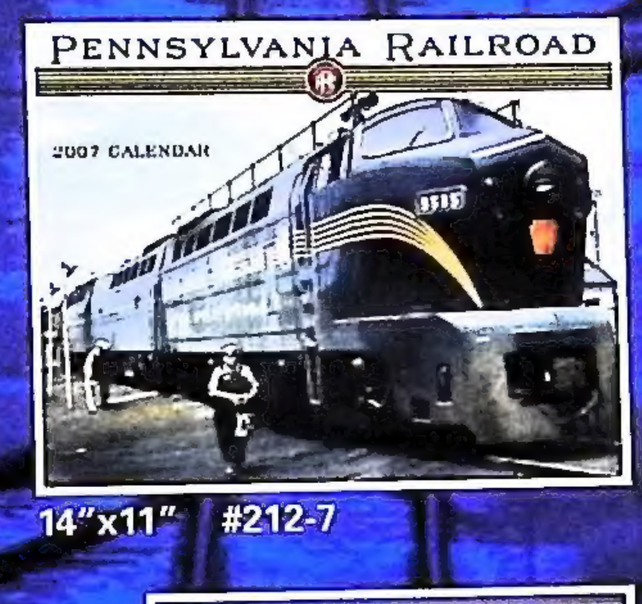

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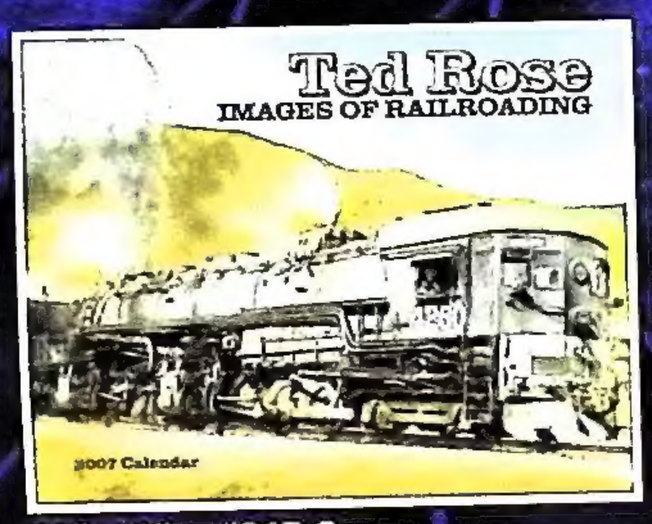

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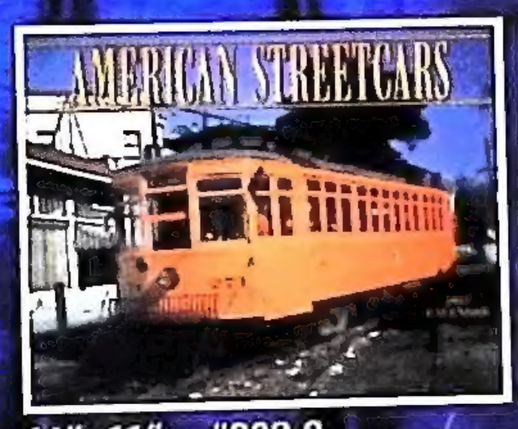

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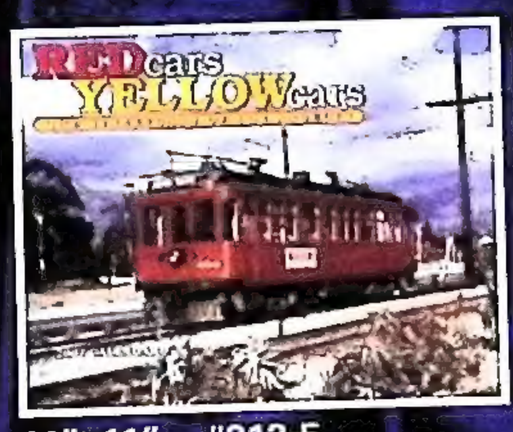

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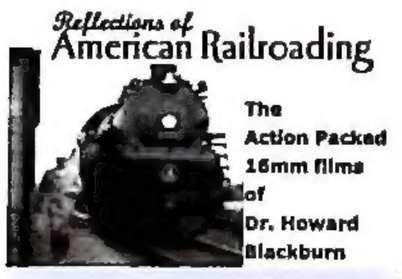

Doctor Blackburn passed away in Sept. 2006. His films will stand as a great tribute to his love of railroading and I will be forever grateful to him for his generosity and inspiration. -Jim Herron

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